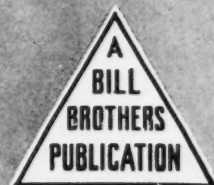


INDIA

RUBBER WORLD

OUR

63rd YEAR



MARCH, 1952

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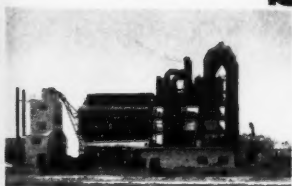
MAR 28 1952

A New CABOT SRF Plant

....because you asked for it

SRF SECTION
OF THE NEW
CANAL PLANT
NOW IN OPERATION
TO PRODUCE
ANNUALLY
MORE THAN
20,000,000
POUNDS

STERLING-S



LOCATION Cabot, St.
Mary Parish, near
Franklin, Louisiana.

On the Gulf Intra-
coastal Waterway
and Texas-New Orleans
branch of the Southern
Pacific Railroad.

GODFREY L. **CABOT**, INC.

77 Franklin Street, Boston 10, Mass.

DU PONT ANNOUNCES

Neoprene Type WRT

A NEW GENERAL PURPOSE NEOPRENE

Neoprene Type WRT combines an unusual number of advantages in one polymer. You'll find this new neoprene has outstanding resistance to stiffening in the uncured state. Stocks retain their tack—building operations are no problem. Type WRT compounds are also remarkably free from crystallization when cured. And compression set is *excellent* over the widest temperature range available with any neoprene. It's good at -50°F. and better at 300°F.

Processing is another plus value in Neoprene Type WRT. It handles on the mill in much the same fashion as Type W. Storage characteristics are excellent, too. And because Type WRT is a neoprene, it has all the properties—chemical, oil and sunlight resistance—you've come to know in the neoprenes.

Why not let Neoprene Type WRT prove itself? We'll be glad to send you samples. For more complete information, consult Report No. 52-1. If you don't have your copy, call your Du Pont representative or write:

E. I. du Pont de Nemours & Co. (Inc.), Rubber Chemicals Division,
Wilmington 98, Delaware.

Good
Tack
Retention

Outstanding
Resistance to
Crystalli-
zation

Excellent
Set at Both
High and Low
Temperatures

DU PONT RUBBER CHEMICALS

E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Del.



150th Anniversary

BETTER THINGS FOR BETTER LIVING... THROUGH CHEMISTRY

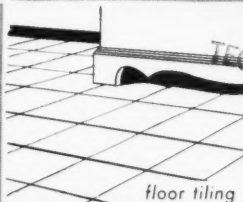
BRANCH OFFICES:

Akron, Ohio	40 E. Buchtel Ave.	Hemlock 3
Boston, Mass.	140 Federal St.	Hancock 6-1
Chicago, Ill.	7 S. Dearborn St.	ANDover 3-70
Los Angeles, Cal.	845 E. 60th St.	ADams 3-52
New York, N. Y.	40 Worth St.	CORtlandt 7-39

News about B. F. Goodrich Chemical Company raw materials

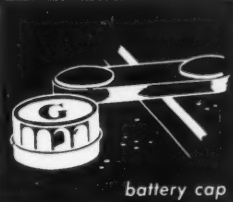


shoe soling

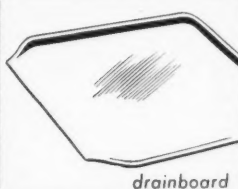


floor tiling

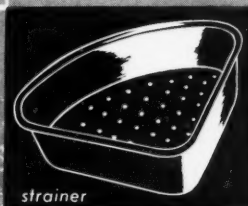
TECHNOLOGY DEPT.



battery cap



drainboard



strainer

improve your
rubber compounding
-cut costs, too!

...WITH **Good-rite** RESIN 50

GOOD-RITE Resin 50 is an easy-processing reinforcing agent with advantages that cut rubber compounding costs—and improve finished products.

It affords a new and simple compounding approach to hardness problems. For example, it's a means of filling in the gap between soft rubber compounds and ebonites.

More advantages! It saves time by eliminating masterbatching. It gives rubber compounds better flex life . . . higher elongation . . . improved abrasion resistance . . .

and easier handling because Resin 50 acts as a plasticizer at processing temperatures.

In extruding gaskets, tubing, coving, etc. —especially on hard compounds—Resin 50 provides improved surface smoothness and superior processing characteristics in the extruder.

Good-rite Resin 50 is a white, free-flowing powder. It can be compounded in a wide range of attractive colors. Send for technical bulletins. Find out how Good-rite Resin 50 improves rubber compounding,

cuts costs too. Please address Dept. CB-2, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

Hycar
Reg. U.S. Pat. Off.
American Rubber

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON organic colors

March, 1952

657



*How true to the die can a molding be?
Use Philblack* A and you will see!*

Just how perfect can you get? Philblack A helps rubber come clean from the mold, exactly as you want it! Thin, precision edges. Intricate shapes! Glossy surfaces.

In addition, desirable resiliency plus smooth, fast tubing qualities make this black a favorite with manufacturers of inner tubes. Suppleness and pliancy of uncured stock is retained after vulcanization.

Use Philblack A in natural, GR-S, reclaim and low temperature polymers for rubber compounds with excellent physical characteristics and high quality appearance.

Philblack A is shipped in bags or in bulk in hopper cars specially designed for swift, easy unloading. Philblack technical service representatives will be glad to assist you in compounding and processing problems.

PHILLIPS CHEMICAL COMPANY

PHILBLACK SALES DIVISION

EVANS BUILDING • AKRON 8, OHIO


PHILBLACK EXPORT SALES DIVISION • 80 BROADWAY • NEW YORK 5, N. Y.



A Trademark

Philblack A and Philblack O are manufactured at Borger, Texas. Warehouses in Akron, Boston, Chicago and Trenton. West Coast agent: Harwick Standard Chemical Company, Los Angeles. Canadian agent: H. L. Blachford, Ltd., Montreal and Toronto.

The superflexing Antioxidant that put "SUPER" in SUPERior



Flexamine

65% Antioxidant
PLUS
35% Flex-Cracking Inhibitor
EQUALS
A 100% Superflexing Antioxidant

HEAVY-SERVICE TRUCK TREADS—

De Mattia Flex Cracking Data

Tensile retained after aging 96 hours in
Oxygen Bomb

Tensile retained after aging 96 hours in
hot air at 212° F.

NO FLEXAMINE
306,000 Kilocycles

1.0 part FLEXAMINE
612,000 Kilocycles

11%

60%

51%

62%

FLEXAMINE—The powder blend that disperses rapidly and completely to assure maximum protection in both synthetic and natural rubber.

Use **FLEXAMINE** in **MOLDED SOLES, V-BELTS, CONVEYOR BELTS,** and general **MECHANICAL GOODS** to provide excellent resistance against heat, oxidation and flexing fatigue.

Use **FLEXAMINE** in **WIRE INSULATION** and **LINEMEN'S GLOVES** and **APRONS** to inhibit deterioration caused by oxidizing action of copper and manganese.

PROCESS—ACCELERATE—PROTECT with NAUGATUCK CHEMICALS

Naugatuck



Chemical

Division of United States Rubber Company

NAUGATUCK CONNECTICUT

IN CANADA: NAUGATUCK CHEMICALS DIVISION • Dominion Rubber Company, Limited, Elmira, Ontario
Rubber Chemicals • Aromatics • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices

March, 1952

659



* A Trademark

WORLD



Specify "OSBORN" ...you know it's good

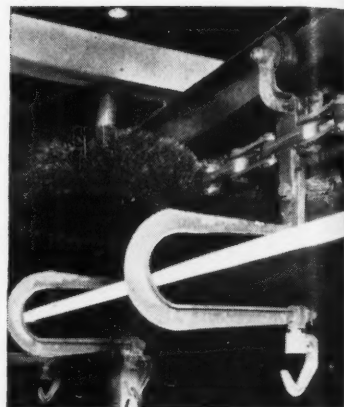
YOU take no chances when you specify leading brands. They've got to be good...top quality merchandise...dependable service.

You are sure to get the best in workmanship and materials when you specify OSBORN industrial brushes, for they are backed by 60 years of service to industry.

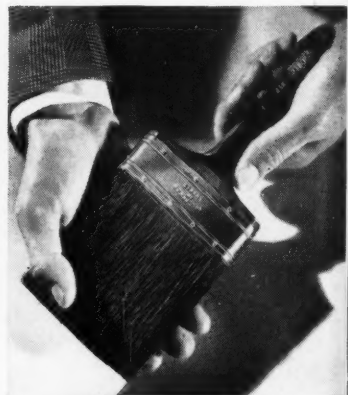
And it's simple to buy Osborn brushes. Just order them automatically from your Industrial Distributor along with other mill supplies. Write for handy pocket catalog. *The Osborn Manufacturing Company, Dept. 666, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Osborn Brushes

OSBORN POWER, MAINTENANCE AND PAINT BRUSHES AND FOUNDRY MOLDING MACHINES



SOLVES PROBLEM. Two Osborn Disc-Center* Wire Wheel Brushes, mounted as shown, remove dirt and scale continuously from conveyor as it operates. Eliminates former dismantling, down-time and cleaning expense. Problems of all kinds... maintenance and production... are being solved every day with Osborn power brushes.



SAVES TIME. Why not adopt a standard policy of saving time by specifying OSBORN on all requisitions for paint, maintenance and power brushes? No need to "shop around." You *know* you're getting top quality and low end-of-service cost with OSBORN brushing tools.



STREAMLINES BUYING. You can make one order cover OSBORN Brushes and other leading-brand mill supplies when you buy from your Industrial Distributor. He can supply the right OSBORN Brushes for your every need, promptly. This standard practice streamlines your purchasing, cuts your supplies inventory, assures you good service.

*Trademark

rubber compounders prefer PLIOLITE S-6B

6 to 1

After direct comparison with competitive resins, rubber compounders throughout the industry report they prefer PLIOLITE S-6B—by nearly six to one! Specific characteristics of this use-proved Goodyear rubber reinforcing resin mentioned in the survey were:

EASIER PROCESSABILITY

MORE THOROUGH COMPATIBILITY

EXCELLENT PHYSICAL PROPERTIES

PLIOLITE S-6B is already in use in shoe soles, wire insulation, flooring, rubber hose and tubing and a wide range of molded and inflated rubber items. But these are only a few of the potential uses of this leader in the field of copolymers for reinforcing rubber.

Write today for full details, and samples for your own evaluation, to:

Goodyear, Chemical Division, Akron 16, Ohio



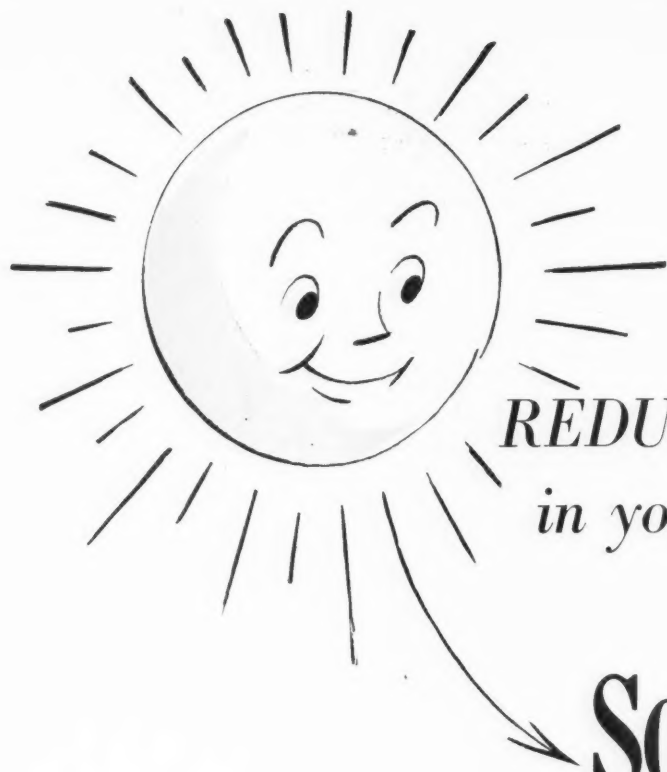
GOOD YEAR

We think you'll like "THE GREATEST STORY EVER TOLD"—Every Sunday—ABC Network

Pliolite—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

March, 1952

661



How to
REDUCE BLISTERING
in your tile processing
with

SOLKA-FLOC[®]

It's an easy job. Just use 20 volumes of SOLKA-FLOC to replace an equal volume of mineral filler. In addition to reduced blistering you'll get harder, smoother surfaces . . . sharper designs . . . controlled shrinkage . . . reduced nerve . . . easier processing.

SOLKA-FLOC, a highly purified cellulose, has found wide application in the rubber field. In fact, it has proved to be such a valuable processing aid in the manufacture of such products as tiling, soling, matting, molded goods, extruded goods, etc., that *Brown Company has doubled its production of SOLKA-FLOC.*

Why not find out more about its use in processing?
It could mean a better product, bigger profits for you.
Write Technical Service, Dept. DF3, at Boston, for
recommendations and samples.

BROWN



COMPANY, Berlin, New Hampshire
CORPORATION, La Tuque, Quebec

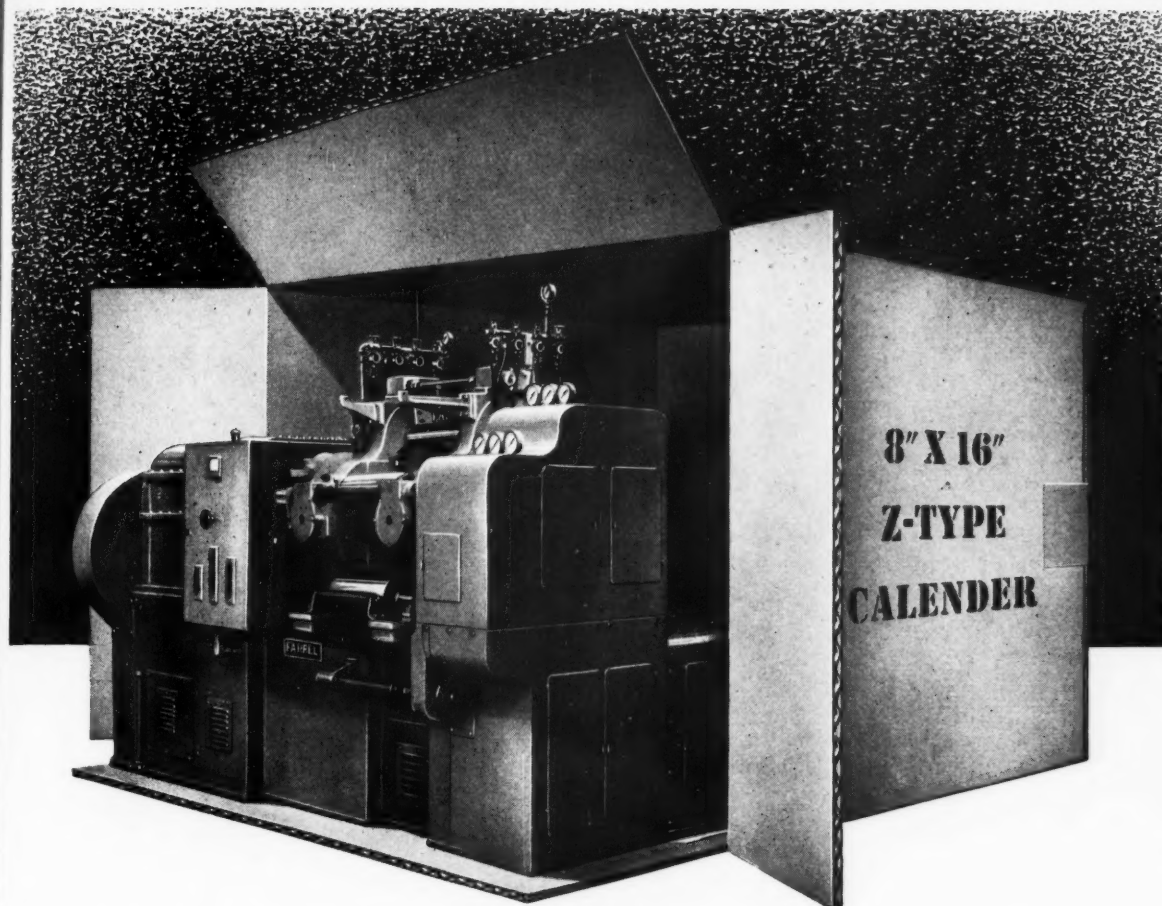
General Sales Offices: 150 Causeway St., Boston 14, Mass. — Dominion Square Bldg., Montreal, Quebec

SOLKA & CELLATE PULPS • SOLKA-FLOC • NIBROC PAPERS • NIBROC TOWELS • NIBROC KOWTOWLS
ONCO INSOLES • CHEMICALS • BERMICO SEWER PIPE, CONDUIT & CORES

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-FLOC
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n package

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HERE IS MAXIMUM CALENDER VERSATILITY IN A SINGLE PACKAGE

This 8" x 16" four-roll Z-type calender is probably the most highly versatile experimental machine of this type ever built. The drive arrangement permits flexibility in roll speeds and ratios for experimentation in single and double coating, sheeting, and running unsupported plastic film of very light gauges.

The drive motor furnishes adjustable speed for the four calender rolls, and a unique arrangement of gears and clutches provides variables in roll speeds one to another. This means that, by a simple movement of clutch levers, the rolls may be set at related speeds determined in advance to be most advantageous for the work to be done.

The rolls are bored and equipped with rotary joints for the circulation of temperature-controlling fluid. Gauge adjustment of all but the fixed lower roll is by hand ratchet. The use of clutches on the top roll

and bottom side roll permits independent movement of roll ends or the simultaneous adjustment of both ends of either roll. In this manner roll openings can be set precisely for the most accurate production to gauge.

This unique calender is an example of the made-to-order laboratory equipment—calenders, Banburys, mills, extruders, refiners, etc.—which you can obtain from Farrel-Birmingham. Send for information on machines to meet your specific needs.

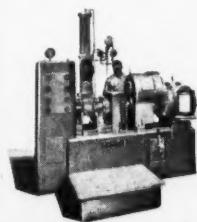
FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.

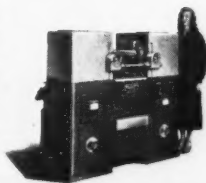
Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago, Los Angeles, Houston

Farrel-Birmingham®

FB-730



This size B Banbury mixer, with a capacity of two pounds of crude natural rubber or gravity of batch times 2, can be conveniently and economically used in making trial batches. It is driven by a four-speed motor and is equipped with an exceptionally large air cylinder for forcing stock into the mixing chamber.



The two rolls of this 6" x 13" self-contained laboratory mill are individually driven, providing a considerable range of operating speeds and friction ratios. Speed range of the back roll is 3 to 48.9 RPM and the front roll from 4.6 to 36.8 RPM. The mill has tiltable guides, scrapers, knee-operated safety trip and cascade lubrication.

NEW!

SUBLAC PX-5 (Powdered Resin)

eliminates use of zinc oxide and accelerators in GR-S and natural rubber stocks!

- eliminates need for zinc oxide and accelerators in using basic fillers (Silene, whiting, etc.)
- oil resistant, light colored
- reaches optimum cure in 10 min. at 325° F.

● TYPICAL TEST FORMULATIONS

	Formula #83	Formula #84
GRS (X631)	100	100
Sulphur	3	3
Silene EF	75	75
Neozone D	1	1
SUBLAC PX-5	30	30
Polymel C-130 Resin .. -		5

NOTE—no zinc oxide or accelerators in these compounds

... AND TEST RESULTS

10 Min. Cure at 325° F.

Tensile psi	1200	1200
Elongation %	250	280
Modulus @ 200%	990	850
Hardness	81	83

ALSO PREVENTS SCORCH IN NEOPRENE!

10 parts of Sublac PX-5 on the rubber acts as a co-accelerator in all non-black neoprene stocks and prevents scorch in both process and bin storage stocks.

Sublac PX-5 also gives a preservative quality to unvulcanized neoprene stocks.

TEST SUBLAC PX-5 YOURSELF, FREE!

Write today for 5 lb. sample and test data. Once you've tried Sublac PX-5 in your own stock, you'll agree it's the biggest development yet in modern rubber processing.

REPRESENTATIVES:

EASTERN: H. M. ROYAL, INC., TRENTON, N. J.
WESTERN: MERIT-WESTERN CO., LOS ANGELES, CALIF.

ALSO ASK ABOUT THESE QUALITY POLYMEL PRODUCTS:

GILSOWAX (solid) — Extender, Wire Compounds
SUBLAC RESINS (powders) — Hardeners, Stiffeners
POLYMEL 6 (solid) — Tires, Camelback
POLYMEL 7 (liquid) — Tires, Camelback, Carcass
POLYMEL D (solid) — Polystyrene-Indene Plasticizer
POLYMEL C-130 (solid) — Plasticizer
D-TAC (solid) — Non-coloring Detackifier

THE POLYMEL CORP.

1800 Bayard Street
Baltimore 30, Maryland
Phone PLaza 1240

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ER WORLD



Use
United Blacks

**UNITED
CARBON
COMPANY, INC.**

CHARLESTON 27,
WEST VIRGINIA

NEW YORK • AKRON • CHICAGO • BOSTON



...for durability
KOSMOBILE 77 (EPC)
KOSMOBILE HM (MPC)

These are the finest rubber grade
channel blacks made. They are
designed to give the compounder exactly
what he is looking for in channel
blacks - - - cool mixing, easy processing,
high reinforcement, and excellent
service performance.

Insist on United Blacks.



UNITED CARBON COMPANY, INC.
CHARLESTON 27, W. VA.
NEW YORK AKRON CHICAGO BOSTON
CANADA: CANADIAN INDUSTRIES, LIMITED



Proper application of a chemical is almost as important as the chemical itself. You'll be glad to know that Wyandotte has a research staff whose job is to see that you get all the technical assistance you require.



Shoes courtesy Converse Rubber Company, Malden, Massachusetts.

Soles grip better, wear longer! Can YOU use PURECAL T profitably?

Treat Wyandotte PURECALT* exactly as you would a carbon black, and get these improved properties:**

Kids give shoes an awful beating. "Cowboys-and-Indians" can grind shoes on hard concrete, test them on slippery roofs, tear them on sharp rocks.

The Problem: A manufacturer wanted to build more safety, tear-resistance, and wear into rubber soles.

The Solution: Reformulation, using Wyandotte Purecal *T*, an ultrafine reinforcing filler — not as an ordinary calcium carbonate, but exactly as they had been using carbon black.

The Results: Soles with extreme

flexibility; good grip on slippery, dangerous surfaces; and unusually long life.

If you use a GR-S; some other synthetic elastomer with poor pure-gum properties; or natural rubber . . . you can enjoy these improved properties, **PLUS** these production advantages:

Purecal T gives you building tack in an all GR-S stock . . . it promotes knitting.

Purecal T lessens "nerve," makes smoother stocks, extends GR-S.

Purecal T has high abrasion resistance for a calcium carbonate . . .

approaches that of the best clays.

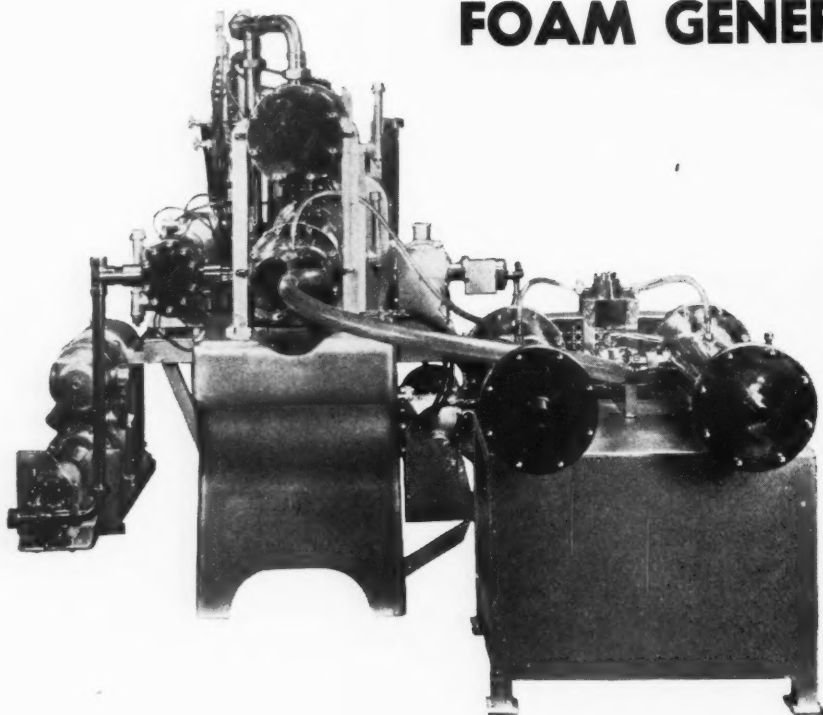
Purecal T is snow-white . . . non-discoloring.

Purecal *T* is one of Wyandotte's family of precipitated calcium carbonates. Do you have any production problems that Purecals might improve or that our technical service may help you with? Write to Wyandotte Chemicals Corporation, Wyandotte, Michigan. Offices in Principal Cities.

*Trademark



the **FLOW-MASTER** *continuous*
FOAM GENERATOR



Equipped with dual blender for continuous operation. Graduated Burrettes for checking metering accuracy of gelling agents, added accelerator, etc.

Self contained unit, requires no accessories or air pumps, ready to install to your water and electric current.

Will produce continuously Foam Rubber of desired density with uniform cell structure from Natural, GR-S, Neoprene Latex, or combinations, suitable for slab, or molded goods, pillows, mattresses, rug backing, carpet underlay, etc.

Low production costs.

THE MARCO COMPANY, INC.
MANUFACTURERS — INDUSTRIAL DESIGNERS — RESEARCH LABORATORIES

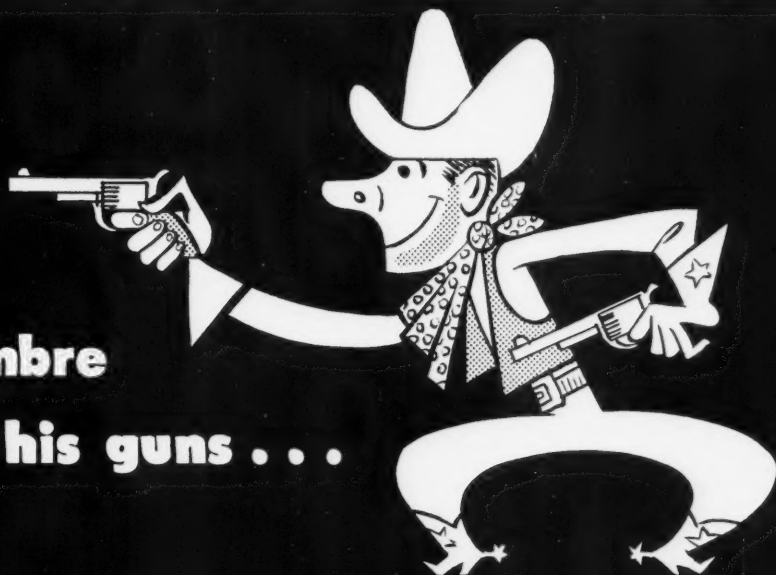
3rd & Church Streets
WILMINGTON, DELAWARE

MS

Foam
with uni-
Natural,
combina-
molded
ing back-

WORLD

**This Hombre
sticks to his guns . . .**



TY-PLY

**the RUBBER-to-METAL ADHESIVE
sticks for a lifetime!**

TY-PLY **Q** or **3640** for bonding Natural, GR-S, and Butyl

TY-PLY **S** for bonding Neoprene

TY-PLY **BN** for bonding N-types

TY-PLY will adhere most vulcanizable rubber compounds to almost any clean metal surface.



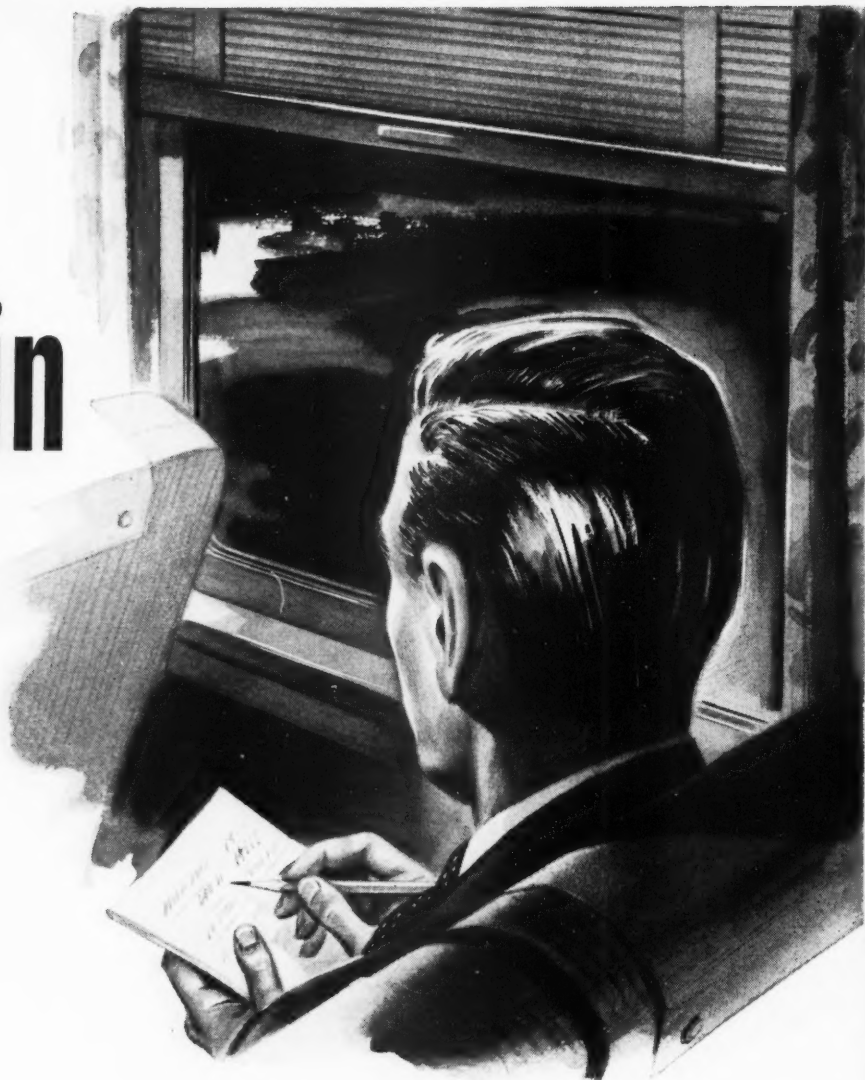
MARBON CORP.

GARY, INDIANA

SUBSIDIARY OF BORG - WARNER

TY-PLY has stood the test of timesince '39

the man in seat 14



"Doc" MacGee says: While the rest of the world sleeps, this man rolls through the night on important business.

He's the Skellysolve Technical Fieldman . . . on his way to help a distant manufacturer solve a new or knotty problem . . . a problem involving the most efficient application of Skellysolve . . . to achieve more uniform and bigger production at less cost.

Trained, experienced troubleshooters like this Skellysolve Technical Fieldman are "on call" for industrial users of Skellysolve. In

other words, the Skellysolve Technical Fieldman is living proof that you get far *more* than a fine solvent when you buy Skellysolve.

You get a skilled engineering service that's bound to be reflected in comparative freedom from solvent worries . . . greater safety in manufacturing operations . . . and savings in your operating costs.

Urgent or routine, whatever your solvent problems may be—seek the advice of your Skellysolve Technical Fieldman for the right answers. Helping to overcome solvent problems is his business!



Skellysolve

SOLVENTS DIVISION, SKELLY OIL COMPANY
KANSAS CITY, MISSOURI

Skellysolve

**a leading name in solvents
for more than 20 years**

A pioneer in the development of close cut fractions, Skelly Oil Company is known for leadership in the engineering, development and marketing of solvents for industrial use.

Skellysolve is your password to dependability of supply . . . plus unsurpassed purity, uniformity, close boiling ranges and special properties to fit your particular needs. Write or wire for more complete technical information.

AETNA-STANDARD BUYS RUBBER AND PLASTICS DIVISION OF NATIONAL-ERIE

E. E. Swartswelter, President of The Aetna-Standard Engineering Company, Pittsburgh, Pa., announces the purchase of the rubber and plastics machinery division of the National-Erie Corporation, Erie, Pa., a subsidiary of Bucyrus-Erie Company.

The purchase includes the drawings, patents and records.

PRODUCTS

MILLS • WASHERS • CRACKERS
SHEETERS • REFINERS • EX-
UDERS • STRAINERS • INSU-
TORS • BANBURY MIXERS •
DRAULIC PLATEN PRESSES •
RIZONTAL VULCANIZERS •
VULCANIZERS • SIMPLEX
CK OPENING DOORS • SPE-
MACHINERY

HALE & KULLGREN, INC., HANDLE SALES

The well known firm of (Andy) Hale & (Gil) Kullgren, Inc., Akron, Ohio, will continue to handle the sales, design engineering and devel-
opment work for Aetna-Standard.
The engineering and sales personnel
of National-Erie will join Hale &
Kullgren in Akron, Ohio.

50 YEARS OF CREATIVE ENGINEERING

Aetna-Standard has a long and envi-
able record in the business of engi-
neering and manufacturing machinery
for the ferrous and non-ferrous indus-
tries. They have two large, well equip-
ped plants and are now completing a
major expansion program to provide
the best facilities for producing pro-
duction machinery.

Aetna-Standard will manufac-
ture a complete line of rubber
and plastics machinery in their
large, well equipped plant at
Warren, Ohio. Sales and design
engineering will be handled by
Hale & Kullgren, Inc., Akron,
Ohio.

In the ferrous and non-ferrous
industries, Aetna-Standard is
well known for continuous butt
weld pipe mills, seamless tube

mills, continuous coating lines,
flat-rolled equipment and draw-
benches. The company has also
been active in the rubber machin-
ery field as a rebuilder of Ban-
bury Mixers and in the develop-
ment of heavy basic machinery.

The company will take over
many of the orders on National-
Erie's books and will solicit
new orders through Hale &
Kullgren, Inc.

Sales Distributors and Designers
HALE & KULLGREN, INC., Akron, Ohio

Aetna-Standard

THE AETNA-STANDARD ENGINEERING COMPANY • PITTSBURGH, PA.

Plants in Warren, Ohio • Ellwood City, Pennsylvania

They last twice as long...vinyl products stabilized with "Dutch Boy" DYPHOS



Two thousand hours *plus* in the Weatherometer without failure . . . that's the record of "Dutch Boy" Dyphos stabilized vinyl compounds.

In plastisols, as well as organosols and emulsion dispersions, Dyphos gives you opaque vinyl products—unequalled in light- and heat-stability—excellent in color retention and long-lasting flexibility.

Dyphos gives you these advantages in vinyl moldings and extrusions, too.

Recommended also for systems using chloro-paraffins as secondary plasticizers, Dyphos is a general purpose stabilizer. You can rely on Dyphos to give your vinyl compounds the qualities needed for standout performance in service.

Let us show you how "Dutch Boy" Dyphos can simplify your operations...double the life of your vinyl formulations. Also investigate the other "Dutch Boy" chemicals. Just write for factual data and technical assistance.

"Dutch Boy" Stabilizers

PRODUCT	USE
TRIBASE (Tribasic Lead Sulphate)	Electrical and other compounds requiring high heat-stability
TRIBASE E (Basic Lead Silicate Sulphate Complex)	Low volume cost insulation
DS-207 (Dibasic Lead Stearate)	Stabilizer-lubricant for sheeting, film, extrusion and molded compounds
PLUMB-O-SIL A (Co-precipitate of Lead Orthosilicate and Silica Gel)	Translucent and colored sheeting and upholstery stocks
PLUMB-O-SIL B (Co-precipitate of Lead Orthosilicate and Silica Gel)	Translucent and colored film, sheeting, belting
PLUMB-O-SIL C (Co-precipitate of Lead Orthosilicate and Silica Gel)	Highly translucent film and sheeting
DYTHAL (Di-basic Lead Phthalate)	General purpose stabilizer for heat and light. Good electrical properties
DYPHOS (Di-basic Lead Phosphite)	Outstanding for heat and light in all opaque stocks, including plastisols and organosols
NORMASAL (Normal Lead Salicylate)	As stabilizer or co-stabilizer in vinyl flooring and other compounds requiring good light-stability
BARINAC (Barium Ricinoleate)	Stabilizer-lubricant for clears



* Reg. U. S. Pat. Off.

NATIONAL LEAD COMPANY
111 Broadway, New York 6, N. Y.

TYPE-S

JOHNSON Rotary Pressure JOINTS

No. 700S-BB Johnson Joints installed on plastic mill. Flexible hose connections permit these self-supporting joints to shift with the rolls, end the threat of misalignment completely. Note stop rod through lugs to keep joints from turning.

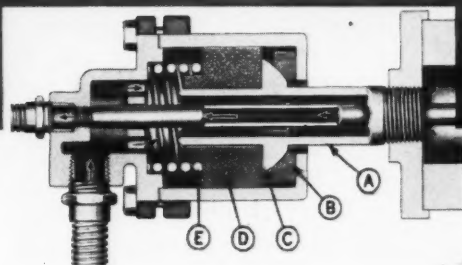
A Packless Stuffing Box that Shifts for Itself!

Stuffing boxes, such as are used to admit steam or liquids into rotating rolls, used to call for endless repacking, oiling and adjusting. The Johnson Joint changed all that.

Misalignment used to be a big source of trouble too, usually bringing rapid wear and efficiency loss. Now that has been changed also, with the Type S Johnson Joint shown in cross section at right.

The Type S cannot get out of alignment. It is completely self-supporting—shifts as the roll shifts. It brings stuffing boxes into line for keeps. And like all Johnson Joints it is completely packless, self-lubricating and self-adjusting.

More and more the rubber and plastics industry is changing over to Type S Johnson Joints, and finding they quickly save their own cost. Many machinery manufacturers furnish them as standard equipment. If you operate calenders, mills, extruders or similar equipment, you should have all the facts.



Slash Maintenance — Boost Efficiency

Cross section view of Type S shows how nipple (A) is connected to roll. Carbon graphite seal ring (B) rotates against convex surface of collar (C). Joint assembly is supported by guide (D) which is also of long-lived, self-lubricating carbon-graphite. Spring (E) is for initial seating only; in operation joint is pressure-sealed.

Joints shown in installation are similar to the above, but have inlet and outlet in same vertical plane to permit head lugs for stop rods. Type S Joints are also available for single flow service, and there are other Johnson Joints for every need.

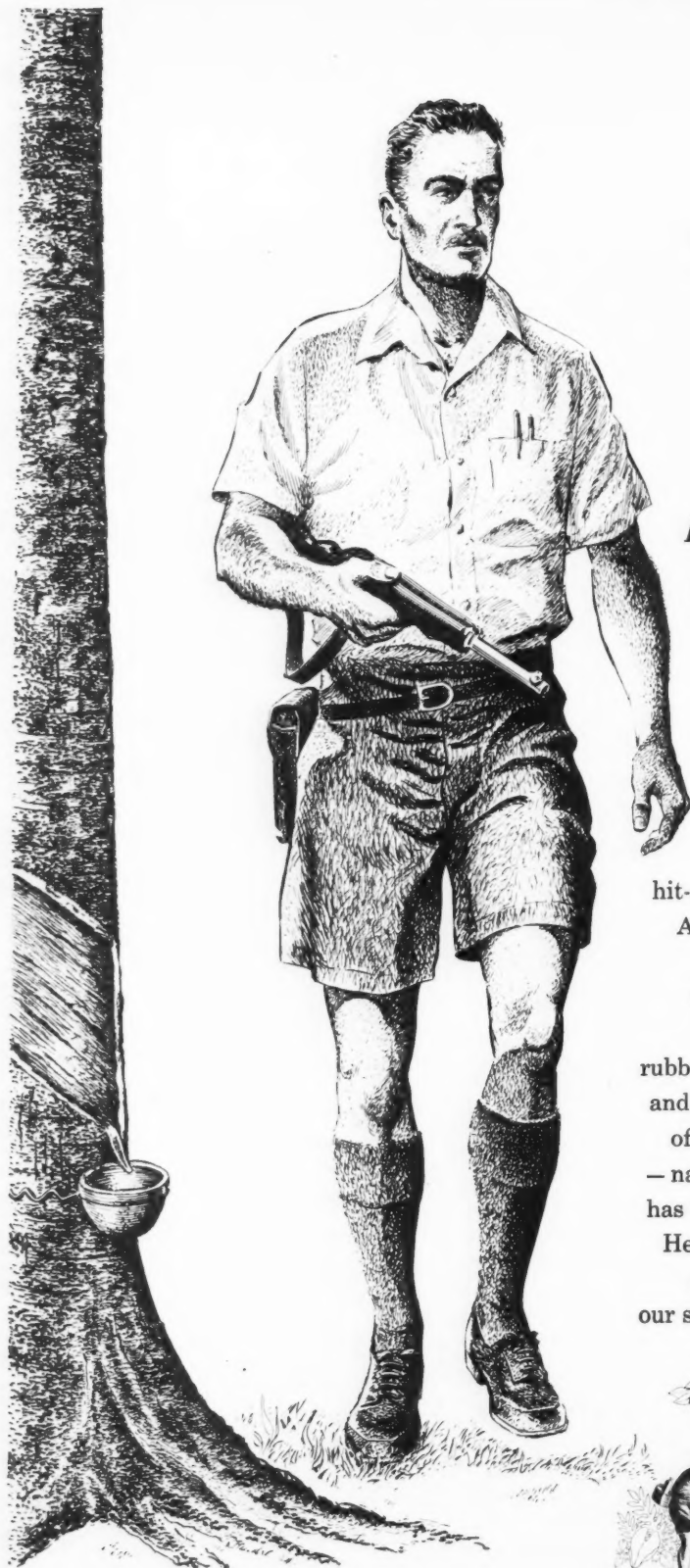
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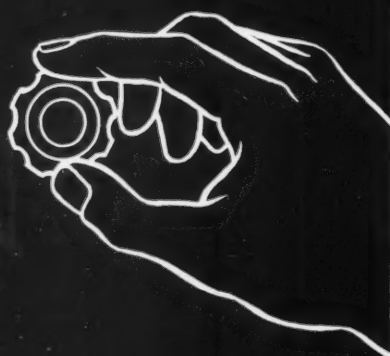
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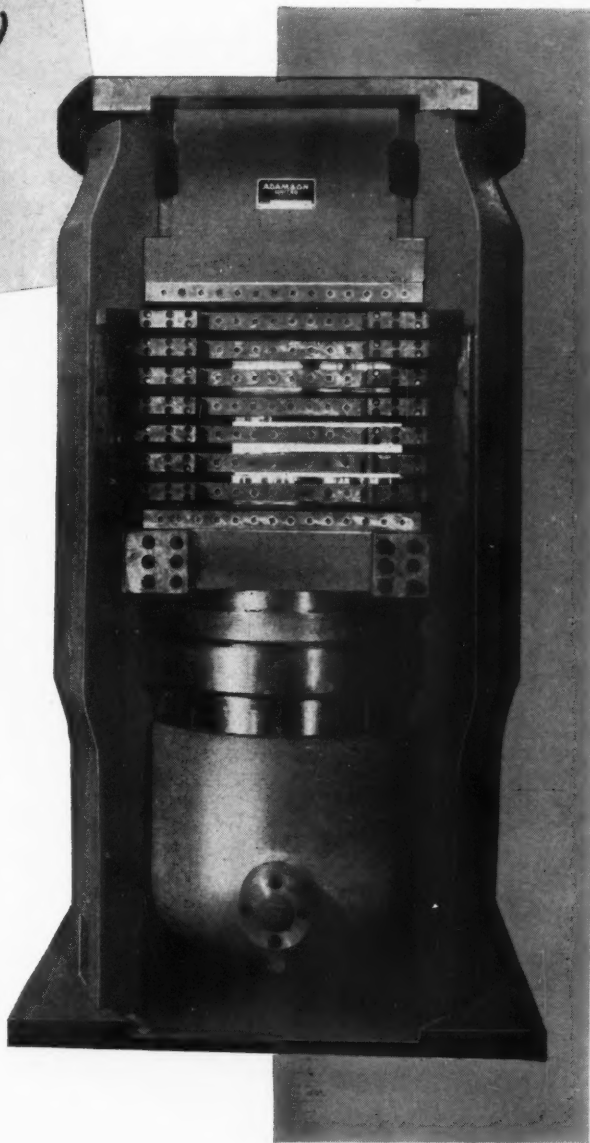


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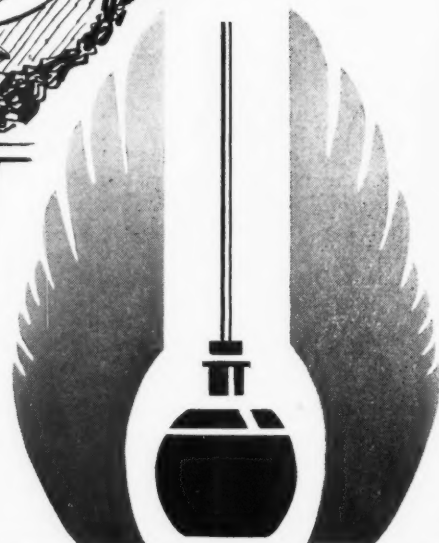
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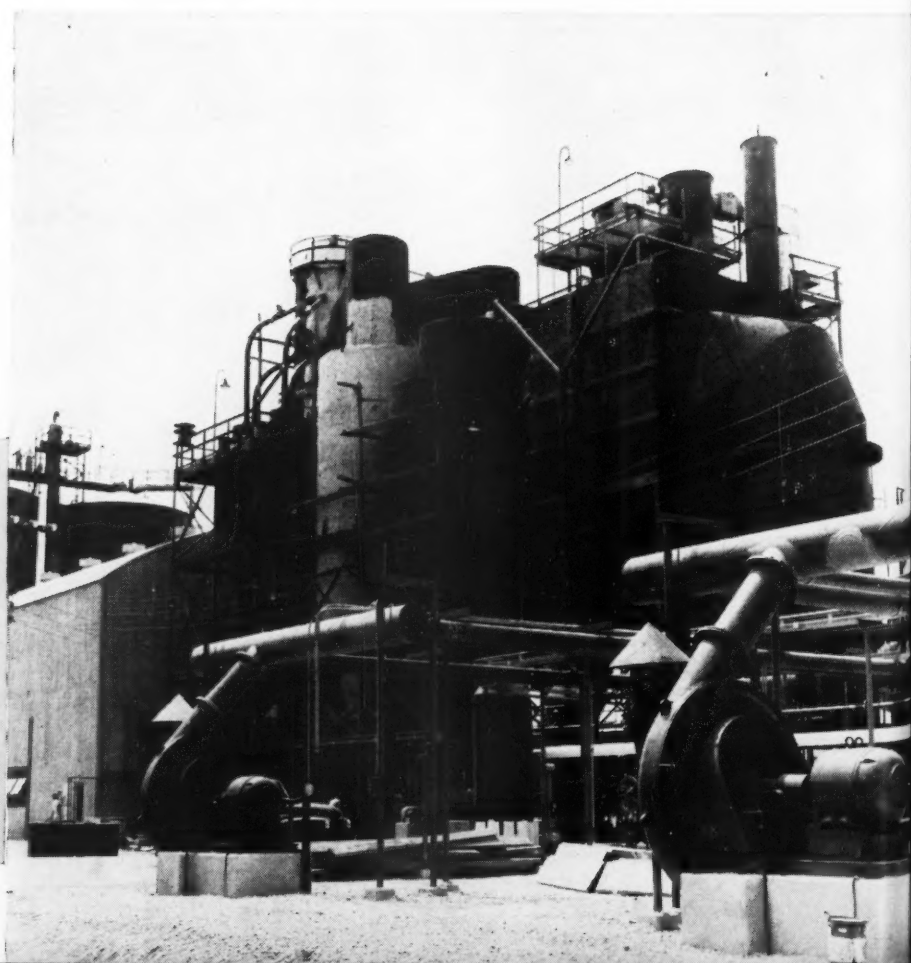


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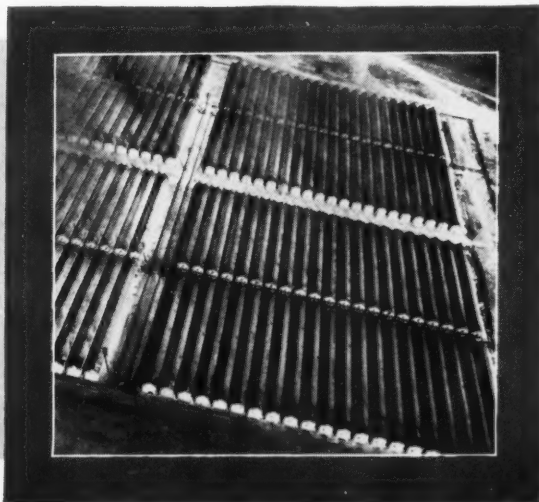
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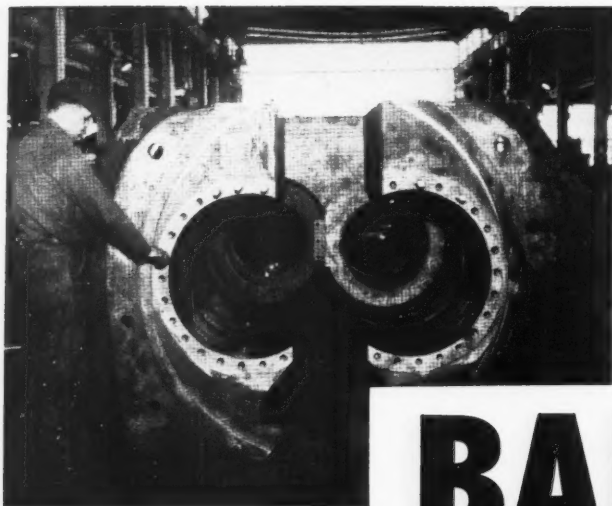


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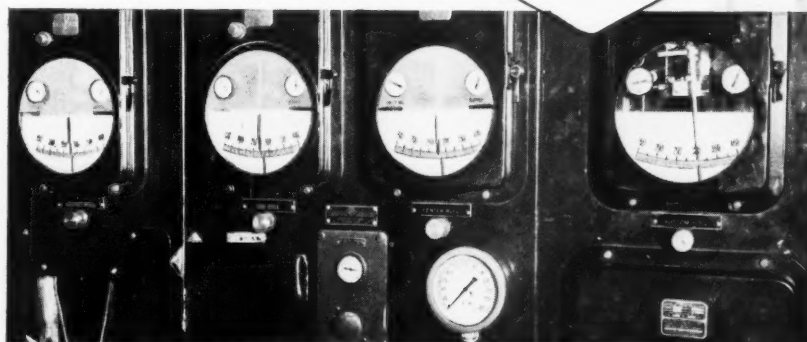
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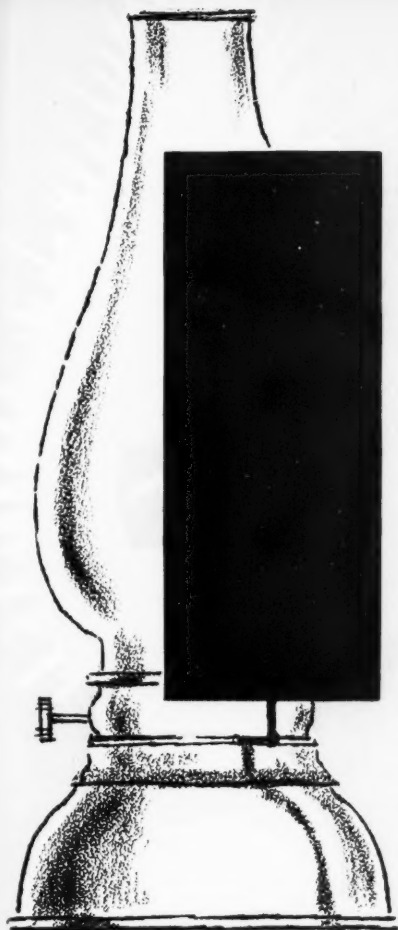
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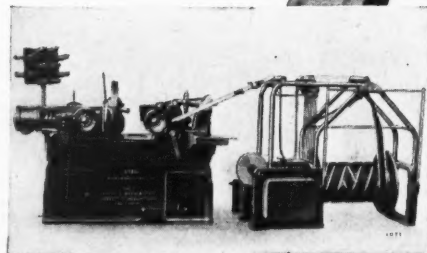
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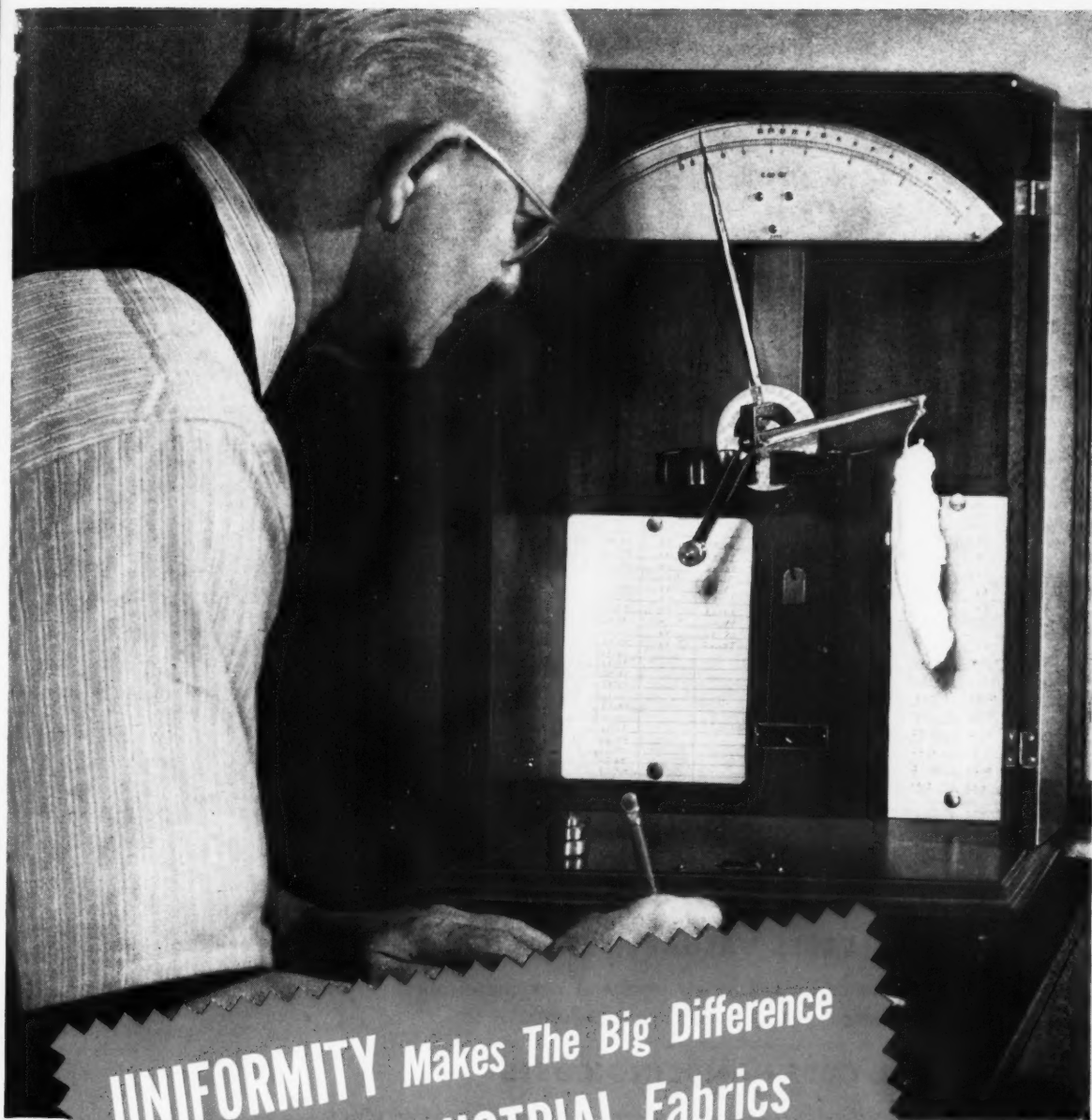
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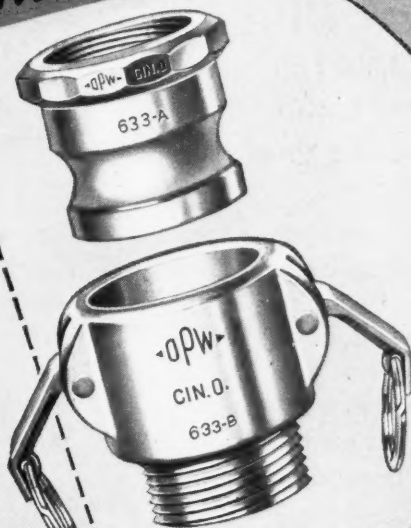
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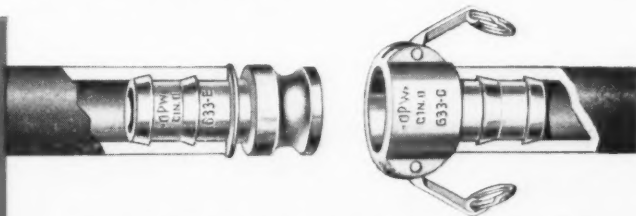
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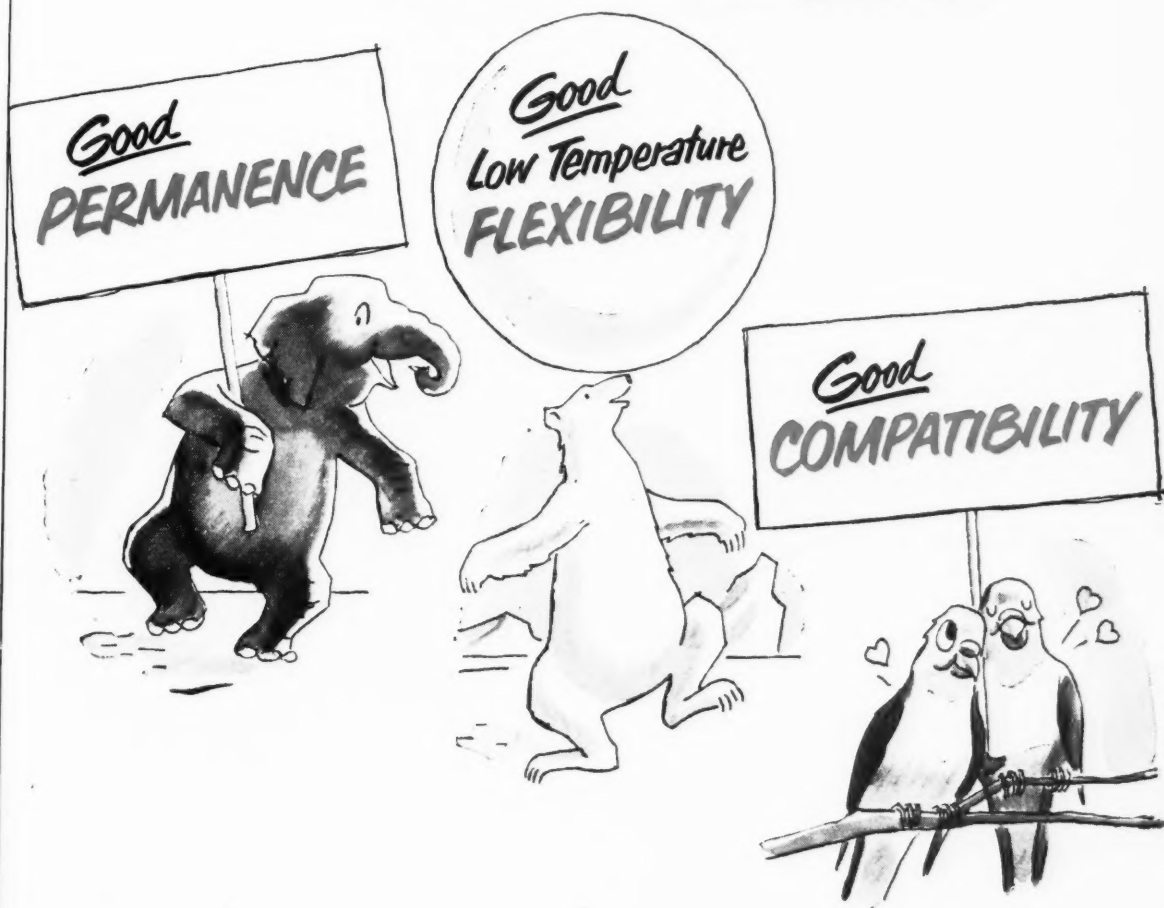
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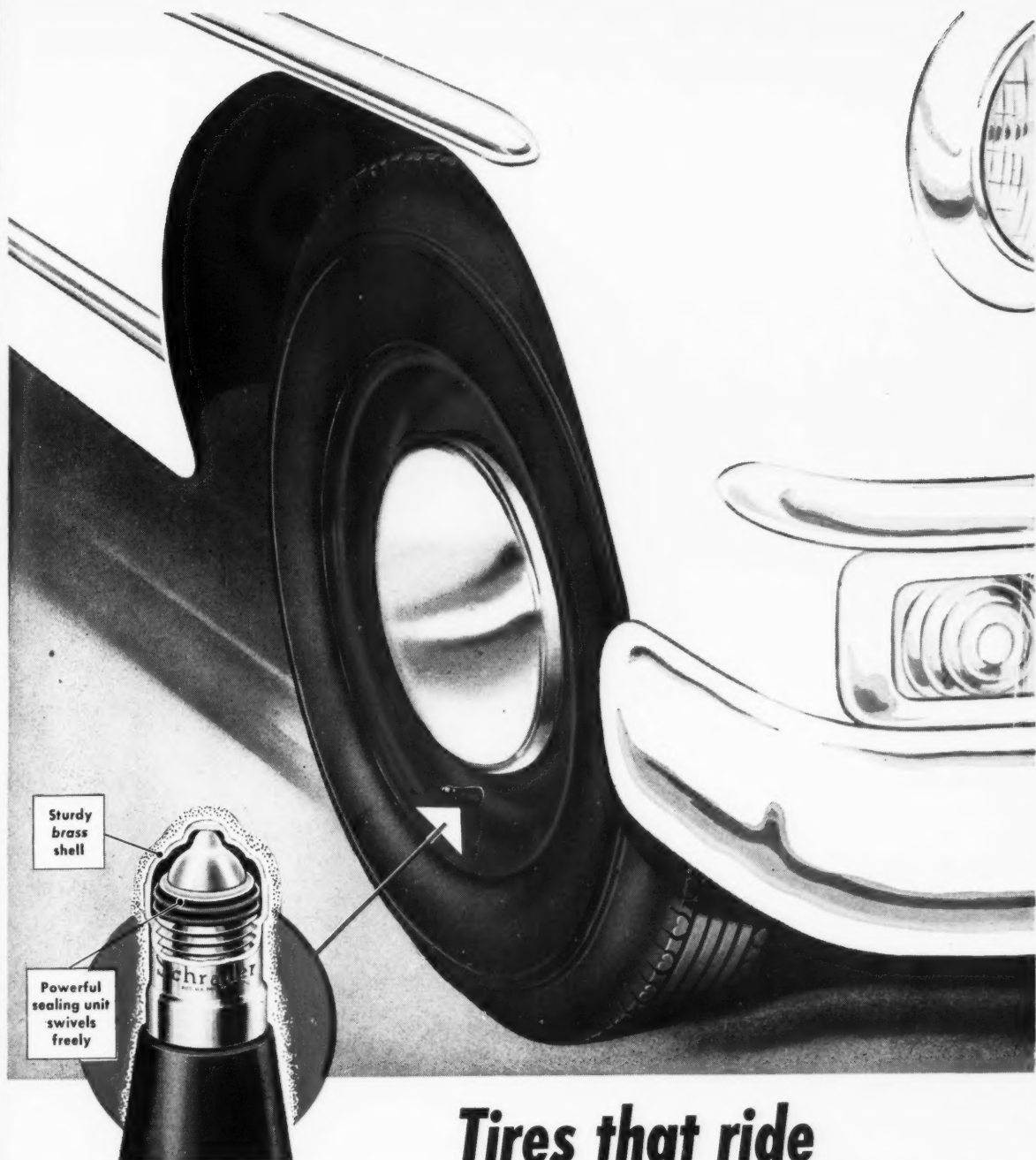
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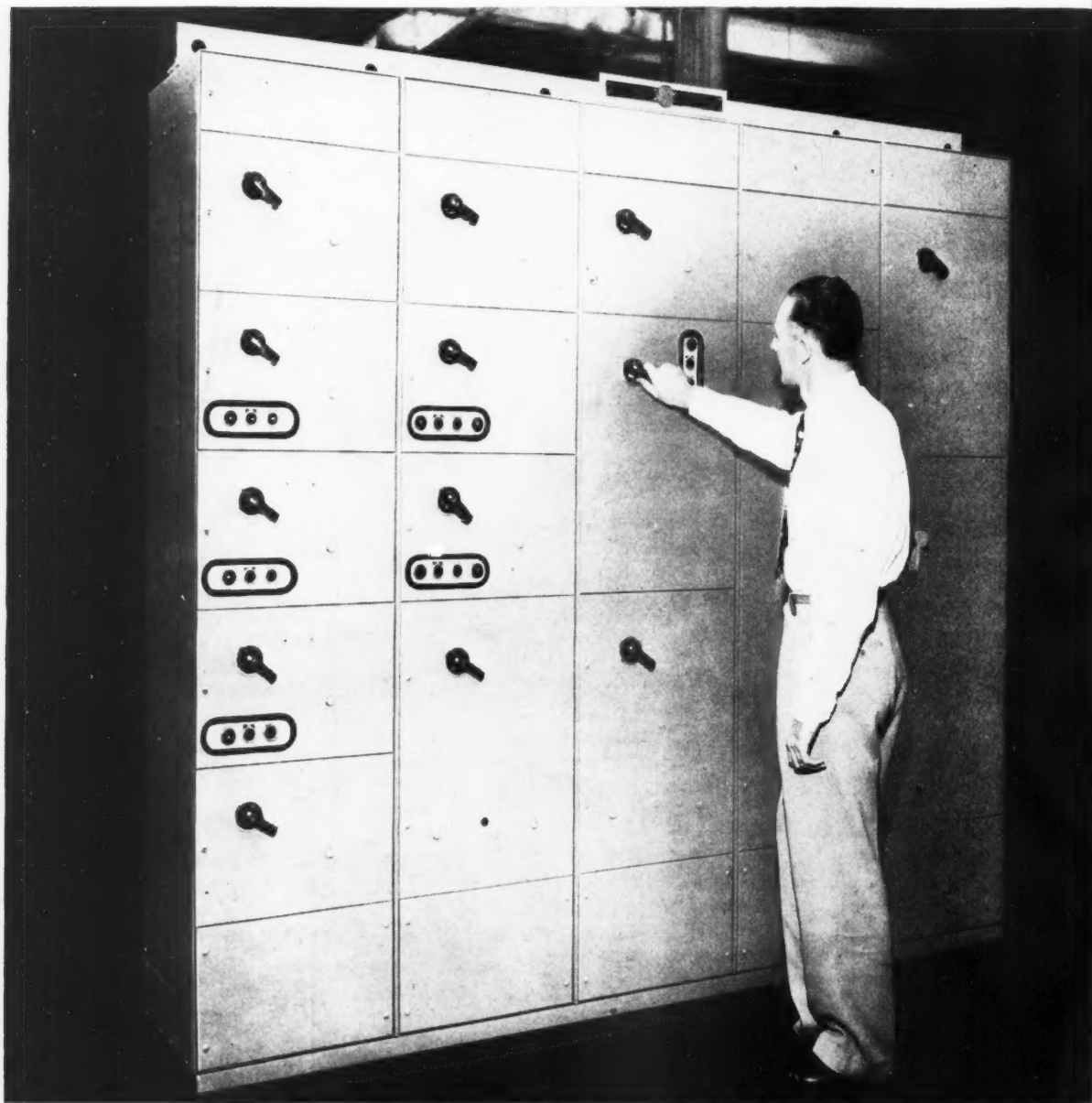
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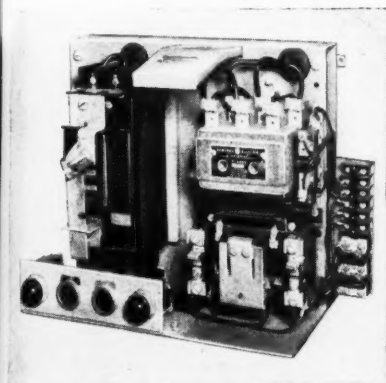
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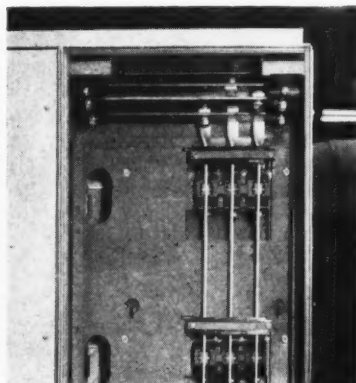
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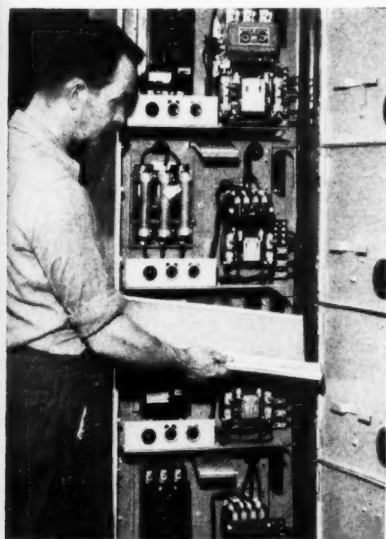
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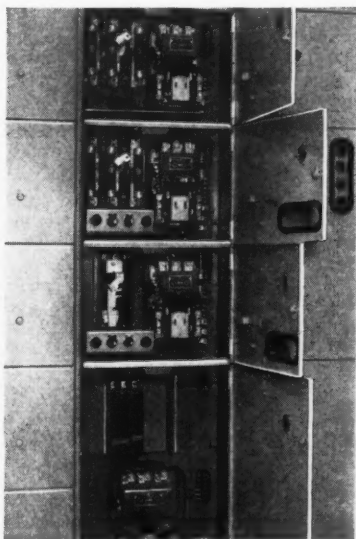
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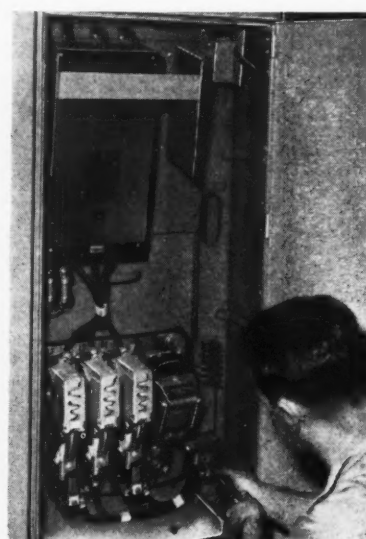
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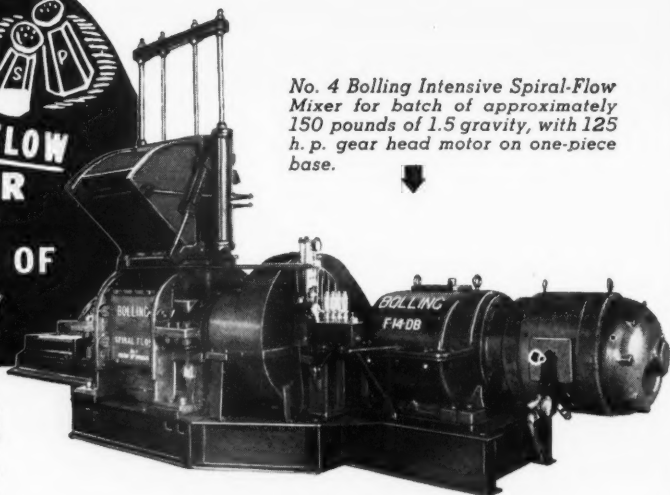
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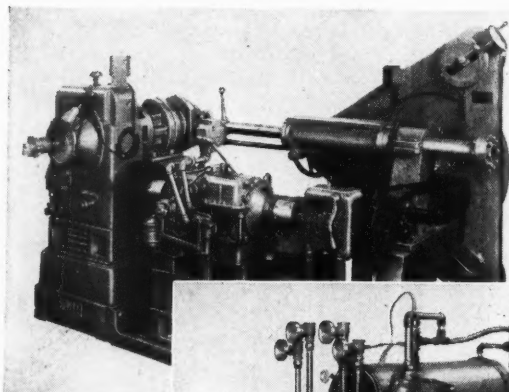
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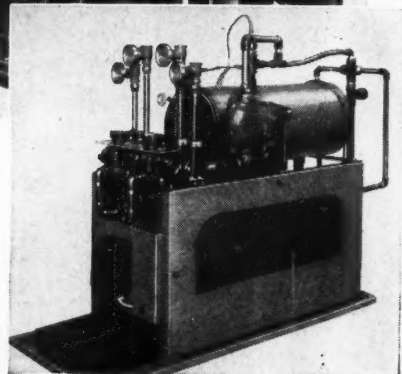
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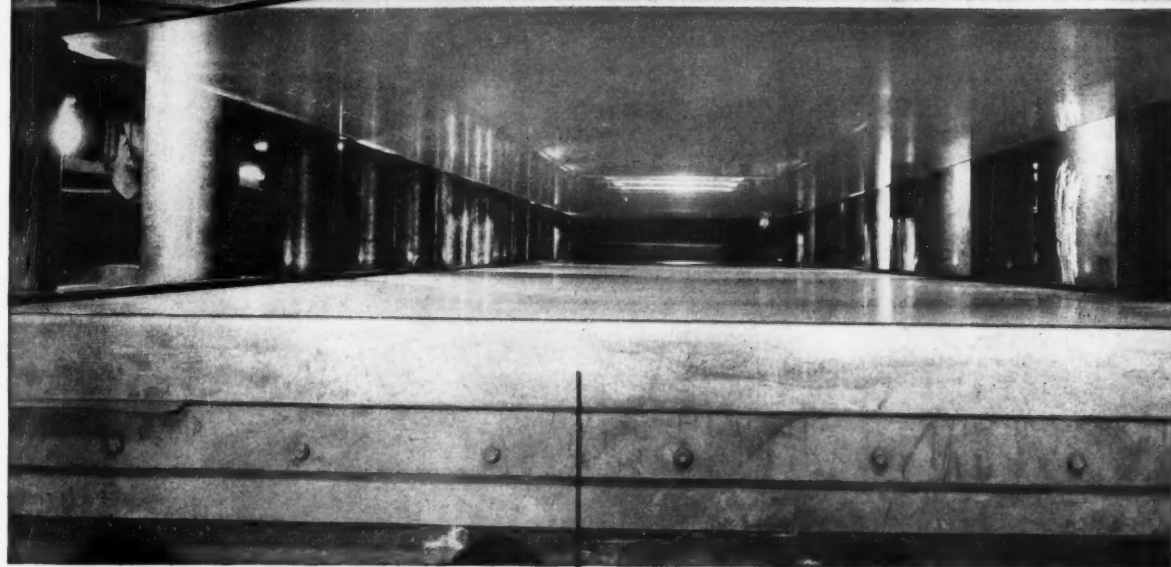
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MARCH, 1952

Vol. 125—No. 6

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INDIA RUBBER WORLD

VOL. 125—NO. 6

MARCH, 1952

Tire and Tube Manufacturing Practice

IT IS obvious that even a most general description of the processes and machinery involved in the manufacture of tires and tubes will have to be written with telegraphic brevity to stay within the wordage permitted an introductory chapter.

The subject matter divides itself into the following sections:

- (1) Preparation of the rubber compounds.
- (2) Processing of the major components.
- (3) Manufacture and assembly of tire sub-assemblies.
- (4) Final assembly or building of the tire.
- (5) Tire curing and finishing.
- (6) Tube manufacture.

Preparation of the Rubber Compound

The problem is to prepare and plasticize the rubber phase and to mix into it the required quantities of pigments (chiefly carbon black), curatives and softeners. A flow sheet of this process is shown in Figure 1.

RUBBER. Natural rubber is received in approximately 240-pound bales either with or without packaging or cover. Synthetic rubber comes in 75-pound oblong bales usually packaged in heavy Kraft paper sacks. The rubber must first be cleaned of the package or cover material and of any embedded dirt picked up in shipment. This operation is primarily manual.

The cleaned rubber may then go directly to the plasticizing or mixing operation, or it may be preconditioned by placing in hot rooms until its temperature has been brought to and equalized at 80-100° F. This conditioning operation is essentially for thawing frozen rubber to prevent machinery breakage, but is also considered an aid to subsequent processing.

CUTTING. Before going to the plasticizing operation rubber may be cut into smaller-size pieces for easier handling; in the case of smaller-size machines, however, such cutting is necessary. Hydraulic activated cutters of the guillotine or pie-cutter types are used.

PLASTICIZING. Normally, rubber is next plasticized by subjecting it to mechanical working at temperatures of 250-350° F. This plasticizing may be done in various types of machines, such as mills, plasticators, and internal

Paul Beebe,¹ A. C. Blank,² W. W. Vogt³

THIS article, taken from the book, "Machinery and Equipment for Rubber and Plastics," Volume 1 of which should be available about April 1, is indicative of the type of articles on rubber goods manufacture that India RUBBER WORLD hopes to present in considerable volume during 1952.

Articles on the basic operations involved in the manufacture of the several major classes of rubber products are noticeable by their absence from the literature on rubber technology. For the benefit of the rubber technicians in the industry particularly, we hope to remedy this situation insofar as possible in the future. EDITOR.

mixers. Chemical "peptizers" may be used as plasticizing aids.

The oldest-type machine is the two-roll mill (size range, 40-84 inches in length) wherein the rolls run at differential peripheral speeds (ratios 1.10:1-1.50:1) to give the shear action required. One roll may be corrugated to reduce slippage of the material on the roll. The steel rolls are cored or hollow, with water circulated therein to control temperatures.

Plasticators are heavy-duty machines of the extruder type wherein the raw rubber is forced by a screw through a relatively small die opening. The usual machine used has a 20-inch-diameter screw with a feed opening large enough to receive, if desired, a full sized bale of rubber.

An internal mixer is, basically, a two-roll mill entirely enclosed so that shear action is developed not only between the rolls, but also between the rolls and the enclosing shell. Variable rotor peripheral speeds are in use varying from 115-230 feet a minute; while machine capacities range from 100-875 pounds per batch of rubber stock. Rotors are cored for water circulation, as required to control temperatures, and the shells may also be water cooled. This type of machine lends itself to automatic timing of the mixing cycle.

MIXING. In this step the various formula ingredients (pigments, curing agents, softeners, and rubbers) are mixed into a homogeneous whole. This mixing is done on two-roll mills or in internal-type mixers as pre-

¹ Manager of process development, Goodyear Tire & Rubber Co., Akron, O.

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³ Development manager, tire and chemical divisions, Goodyear.

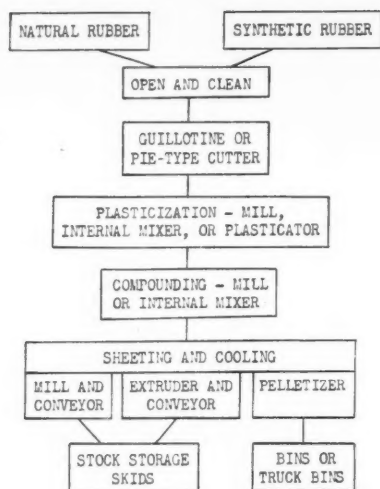


Fig. 1. Flow Sheet of Rubber Compound Preparation

viously described. Extruder-type machines are being experimentally developed for this use.

PIGMENT HANDLING. Pigments are received in bags, drums, and, in the case of certain carbon blacks, in tank or hopper cars. Bags and drums go directly to mixing machines for manual weighing or to hoppers for automatic weighing. Carbon black may be pelletized, in which form it flows easily, and can be transported in tank cars, stored in bulk bins, and withdrawn by gravity or conveyor and automatically weighed into the internal mixer. A completely closed system from tank car to incorporation into the mix is thus possible. The dust from the ventilating system is caught in bag-type dust collectors.

SHEETING AND COOLING. At the conclusion of the plasticizing and/or mixing cycles stock temperatures range from 225-325° F. It is, therefore, necessary to sheet the stocks and cool them to prevent scorch and permit stacking on skids for storage. Where the two-roll mill is used for mixing, the stock comes off in sheet form and is manually cut in suitable lengths and hung up until cooled. These sheets may be hung either on trucks or on hook conveyers for transporting as well as cooling to a central laydown station.

Where the internal mixer is used, the stock is discharged as large, irregularly shaped pieces on to a two-roll mill or extruder. If a mill is used, the stock can be handled manually, as described above, or, as can also be done if an extruder is used, it can be discharged as a continuous sheet on to a conveyor on which it is cooled, cut to size, and laid down on skids, all automatically. The stock may be discharged from the internal mixer directly into a large extruder equipped with a head and cutter designed to form the stock into small cylinders (pellets). These pellets can be charged directly into screw conveyers for cooling and dusting and then conveyed (sometimes pneumatically) to bins for storage.

Processing of the Major Components

The major components of the tire are the preformed tread and sidewall, the rubber coated cord and square-woven fabrics from which the body of the tire is constructed, and the steel-reinforced beads which provide the anchorage to the road rim. (See Figure 2.) A flow sheet on the processing of these major components is shown in Figure 3.

WARM-UP MILLS. Preforming machines, such as tubers and calenders, require stock in a state of plastic and thermal equilibrium. For such stock preparatory work, regular two-roll mills are normally used. Stock is delivered to these mills either in slab form (cold) on in continuous sheet or strip form direct from the mixing operation. When the stock has been worked on the mills until it has become softened by the heat developed and reached approximate thermal equilibrium (from 180-225° F., depending upon the type of stock used), it is strip fed continuously to a tuber or calender. Usually two, three, or four mills are arranged in series so that stock passes from one to the other and is finally stripped off for the tubing machines. An internal mixer may be substituted for the first or first two mills of a series. There are also devices in use which automatically cut and blend the stock through the mills and repeat these operations until stock is removed.

TREAD AND SIDEWALL EXTRUSION. The tread and sidewall (outside covering) of the tire is preformed prior to application in the tire building operation. For this purpose warm, plastic, compounded stock is forced through a die by a screw rotating in a closed cylinder, the so-called tuber or extruder. Many other items, such as inner tubes, flaps, strips, etc., are also preformed in this type of machine. Tubers vary over a wide range of sizes, with screw diameters of 2-15 inches. Screws vary in their pitch, shape, and number of flights in the search for uniform gage, freedom from pulsation, low temperature operation, and high output. Where tread and sidewalls are of different compounds, they may be tubed separately or concurrently by arranging tubers in tandem with subsequent ply-up, or by a duplex arrangement which consists of two single tubers discharging to and through a common head and die.

From the tuber the discharge is on to a conveyor for cooling, weighing, and cutting to length. This procedure may involve the use of a rotary cutting knife to produce an angled skive, or the skiving may be performed as a separate operation after the treads have been cooled. Treads are stored for use in liner skids, tread books, or, more generally now, in metal trays. Means are also provided for release of all strains in the extruded piece so that subsequent change of shape (shrinkage) is minimized. Four-roll calenders have also been used for this purpose wherein one roll is cut to the tread contour desired. A current modification is the use of two small contoured rolls in place of the conventional die at the exit of a tuber.

FABRIC PREPARATION AND DIPPING. Rayon and nylon cords must be treated with an adhesive to promote an

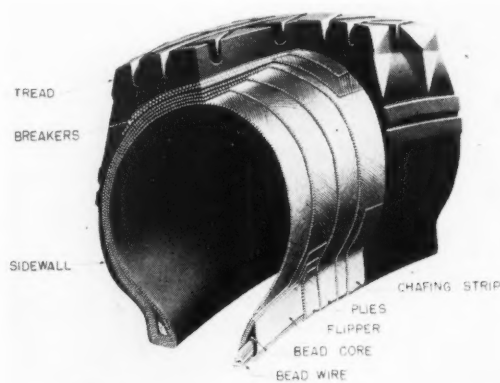


Fig. 2. Cross-Sectional View of Tire

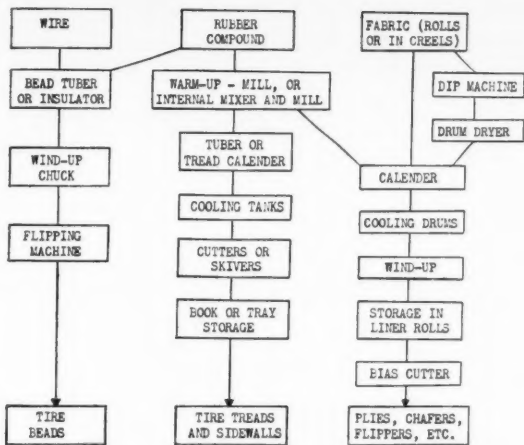


Fig. 3. Flow Sheet of Processing of Major Tire Components

adequate union between the cord and the rubber compound and assure good service in the finished tire. Cotton cord is generally treated with an adhesive, but the bond, because of mechanical interlocking of the cotton fibers with the rubber, may be satisfactory without the adhesive.

As a consequence, any of the fabrics may be woven or supplied on cones or spools and, depending on the type of material, may go directly to the calender or be supplied from a creel to the dip machine and thence to the calender. The dip machine may be set up in train with the calender or operated as a separate unit.

The dipping operation nowadays, almost without exception, uses a waterbase latex dispersion, reinforced with casein or resorcinol-formaldehyde resin. The dipping machine impregnates the cord with the liquid adhesive and dries the fabric to a low moisture content, meanwhile maintaining a sufficient tension on the fabric.

FABRIC CALENDERING. The rubber compound covering of the cord is done on one or more calenders which apply a coat to both sides of the cord and, in addition, may or may not include a friction application of stock between the two coats. A single three-roll calender may be used, but requires two or three passes. A train of two or three three-roll calenders may be used and requires only one pass. On a four-roll calender, of either the straight, L, or Z type, both coats can be applied simultaneously.

Calenders are of various sizes and are used for various purposes, but the usual size for coating cards has rolls 66-72 inches long, which handle the usual 60-inch-wide woven fabric. Provisions for heating and cooling the rolls and gage control of the rubber sheet are included.

Drying drums are sometimes used ahead of, but in synchronization with the calender both to dry fabric to 2% moisture content or less and to heat it for better coating application. Alternately, the fabric may be dried and heated by passing over steamheated platens, i.e., the so-called cell dryer.

Cooling drums are usually used to reduce the temperature of the cooled fabric below the scorch level prior to winding it up in the rolls. Square-woven fabric liners are wound up with the coated fabric to prevent adherence of the tacky uncured rubber coat surfaces. Frequently these liners are treated (impregnated or coated) with non-adherent materials such as pyroxylin, oxidized oil compositions, soaps, etc. The cord fabric so prepared is used for body plies, breakers, and certain types of flippers.

Square-woven fabrics are processed in the same gen-

eral manner for use as flippers, chafers, and bead wraps. Generally these are of cotton construction and are not dipped. The friction motion of the calender is usually employed once, sometimes twice, to drive the rubber into the interstices of the fabric, after which step one or more coats of rubber compound may also be added.

BEAD MANUFACTURE. The basic operation in bead manufacture is to apply the rubber compound to the wire and to wind the required number of wires into a bundle of proper diameter. This operation is performed by coating the wire with rubber by means of a small extruder, with guiding and insulating dies placed at right angle to the extruder barrel and screw. The wire may be insulated singly or in multiple, or it may be woven into a tape or braided prior to being insulated.

From the insulating machine the coated wire is generally run through water or over cooling drums and thence either may be spooled for subsequent forming of the bead core or bundle, or, more generally, may pass directly to a festooner from which it is withdrawn to a bead building machine. This machine automatically rotates a building chuck of the correct diameter several times until the required number of turns of wire has been built up. The wire is then cut off, and the bundle is ready for further assembly. The bead core may be used either as is; a layer of bead wrap (rubber coated square-woven fabric) may be applied as a straight wrap, or a spirally wound layer of wrap may be applied.

Manufacture of Tire Sub-Assemblies

The chief sub-assemblies of the tire are as follows: treads and sidewalls; bead assemblies; and fabric assemblies, including cord plies or ply bands, breakers or inserts, cushions, gum strips and squeegees, chafers, and flippers.

Tread and sidewall assembly was discussed in the preceding section. Bead assembly consists of applying to the bead core bundle the proper lay-up of gum coated fabrics ("flippers"). A machine known as a flipping machine rotates the bead bundle and, by means of guiding, turning, and stitching attachments, secures the flippers to the bead core. A bead filler strip of gum (sometimes called an apex strip) may be added at this point.

FABRIC ASSEMBLIES. The fabric elements used to produce the rest of the tire sub-assemblies have one thing in common: they are all bias cut (as shown in the flow sheet of Figure 4). This operation is performed on either vertical or horizontal-type machines. Also in use is the rotary bias cutter which has a spiral knife (similar to that of a lawnmower blade) that rotates against the fabric and produces the desired angle and width of ply. This rotary cutter lacks the ready adjustability of the other types, but is a fast machine for certain applications.

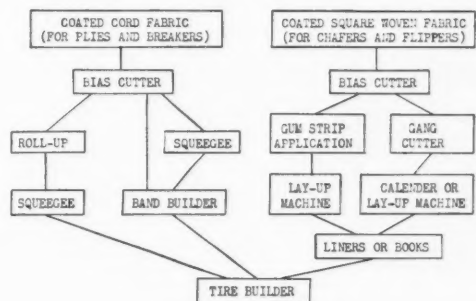


Fig. 4. Flow Sheet of Tire Fabric Sub-Assemblies

The calendered cord fabric is bias cut to the correct width and angle and rolled up into liners for subsequent use at either the tire machine or the band builder. Frequently an additional coat of rubber is applied to the cord fabric. For this operation (known as squeegeeing or recoating) the bias-cut fabric, spliced into continuous lengths on the take-away belt of the bias cutter, is fed directly into a small calender which applies the required width and thickness of gum.

Alternatively, the bias cutter may be furnished with a take-away belt and a series of rolls and let-offs from which the calendered gum is taken from liners and applied. As another variation, the bias-cut material is spliced to continuous length and taken to the calender where the extra coating material is applied to the fabric as a separate operation. Band building consists of building up an endless structure of two to four plies of coated fabric. These bands may be built on a machine that uses an endless fabric belt equipped with roller stitchers, or they may be assembled on a steel drum. The multiplicity of combinations of cord fabric plies as to width, staggered step-offs, squeegees, and gum strips over the ply edges, etc., gives the machine designer a wide latitude in devising and adapting.

Breaker manufacture follows the same general procedure discussed above. Here, also, the breaker plies may be used as single units, open-end assemblies, or built into bands. Once again extra rubber coats, here generally referred to as cushions, may be applied in all the various combinations which the imagination of the tire designer may devise.

Chaffer manufacture also starts with the gum coated fabric going to the bias cutter. Because the widths of cut fabric required are much fewer than those required for the plies, a slightly different variation may be employed at this point. The fabric may be cut in wide widths on the bias cutter, spliced into continuous length on the take-away belt, and then fed through a gang splitter. This splitter is simply a series of power-driven circular knives, adjustable for width of cut, which splits the wide width of fabric into a number of narrower widths.

These narrow widths, in turn, may be led directly to a small three- or four-roll calender by means of which gum strips may be applied to the surfaces or over the edges of the strips. These strips may then be guided together and laid up in staggered arrangement on a roll-up conveyor equipped with notched knives to cut the assemblies to length, following which operation they are rolled up in continuous liners for subsequent use at the tire machine.

Of course there are many other methods of accomplishing the same purpose. For example, the fabric may be cut in single widths at the bias cutter and delivered to a lay-up machine where the correct assembly and, if necessary, gum strip application is conducted. The machine designers of the industry have furnished a variety of methods of assembly ranging from the simple drum to exceedingly complex lay-up machines. Space does not permit anything but a general exposition of basic operations.

Flippers are made similarly to chafers, except that the flipper assemblies are combined with the bead core to form a flipped bead assembly for application at the tire machine.

In a discussion of the sub-assemblies it is apparent that the objective is to furnish the tire builder with a minimum number of sub-assemblies which he is required to apply and to build into these sub-assemblies the maximum number of single components. This saves time at the tire machine and makes for greater accuracy and uni-

formity of construction. We now proceed to the subject of tire building.

Final Assembly or Building of the Tire

There are two general divisions of tire construction: (1) application of single plies; and (2) application of 2-4 plies in the form of bands. Generally speaking, there are also two kinds of tire machines, those having flat drums or very low crowned drums, and those using flat-top cores or high crowned drums.

Tires are divided into two general categories, those having single beads, and those having dual or triple beads. It is almost universal practice to build single-bead passenger and small truck tires on low crowned drums, using individual plies. It is the general practice to build dual- or triple-bead large truck tires on high crowned drums, using multiple-ply bands. Individual plies may be used for such tires.

A tire machine is essentially a power-driven, rotatable, collapsible drum or core equipped with a variety of motor controls for starting, reversing, changing speeds, and indexing the drum to stop in certain selected positions. On the mechanical side it is equipped with the necessary guides to position the application of the plies, breakers, chafers, and tread and sidewall units. Also provided are power rollers, stitchers, bead setters, and turn-up tools for turning the plies around the bead.

On some machines automatic timers are provided to carry the machine through a full series of sequences; the only functions of the operator are to apply the various components and make the necessary splicing operations on the drum. Such machines are supplied with the component parts from servicers which hold the plies, treads, etc., and are generally referred to as fully automatic tire builders.

Other machines have certain automatically timed sequences, with the other parts of the operation at the control and option of the operator. These machines are generally called semi-automatic tire builders. The so-called manual tire building machines leave the timing of the operations entirely to the discretion of the operator. In any of these three types, however, the mechanical operations of tread and ply rolling or stitching, and the turn-up and turn-down of the plies may be power actuated. Hence there is almost an infinite number of time-controlled and mechanically powered combinations possible.

SINGLE-PLY METHOD. The single-cord fabric ply may be either pre-cut to length and supplied to the builder from a service tray or liner festooner, or it may be supplied as a continuous length in rolls held in a turret. In the latter case the tire builder tears off the required length of ply material. The ply is applied to the drum through guides and spliced after being drawn around the drum by a single revolution.

Two or more plies are thus applied; the plies turned down; the beads applied, and the plies turned up over the bead. Two or more plies are then applied; the plies turned, and the pre-assembled chafers and breaker, if any, guided on, spliced, and generally rolled down.

The tread, either as an open-end length or banded, is guided on to the drum in such a fashion as to obtain uniform centering and a minimum of stretch. The tread is then spliced, and its whole surface is stitched down generally with pressure stitchers which engage at the center and are progressively moved outward as the drum revolves. The drum is then collapsed, and the tire removed.

BAND-BUILT METHOD. The general method is the same as in the single-ply method, except that the band is an endless structure of 2-4 plies. The trick is to get this

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structure started over the outside edge of the building core evenly and far enough on to the drum to permit the drum to be rotated at high speed.

The centrifugal force flares the unsupported remainder of the band so that it assumes a cylindrical shape, and by means of a poker bar (really like a short billiard cue) this remainder may be spun on to the drum and lined up and centered by aligning the edge with a suitable index. The skirts of the band are now turned down; the bead is set, and the turn-up made and stitched.

The application of the other bands and beads is carried out in a similar manner, and the application of breakers (either as single-ply, open-end assembly, or in band form), chafers, and tread and sidewall proceeds as described above.

Tire Curing and Finishing

The tire, as built, is dimensionally very different from the shape it will take after it has been vulcanized. In order to vulcanize it properly the tire must be cured with internal pressure to consolidate the structure and to make it conform to the mold shape and tread pattern.

AIRBAG INSERTION. Internal pressure is supplied by means of an inflatable airbag through which pressure is supplied to the interior of the tire to force it against the interior mold surface. To the inside of the airbag it is now generally accepted practice to supply heat as well as pressure by means of steam or hot water. The pressure and heat producing media are air or other non-condensable gases, steam, and hot water. All possible combinations and sequences of these media have been used.

The insertion of the airbag (this will be the name used irrespective of the pressure and/or heat producing media) necessitates that the uncured tire acquire some degree of final shaping before cure. The power bagger shapes and inserts the airbag in one step. The vacuum-type bagger first shapes the tire and then stuffs the airbag into the shaped tire. Some particularly difficult tires (those of large cross-section and small rim diameter) may require shaping on a specially constructed thin-gage tube prior to insertion of the curing bag.

To facilitate both insertion of the airbag before cure and easy extraction of the bag from the tire and the tire from the mold after cure, it is customary to apply release agents in the form of talc, either dry or in suspensions, silicones, and other liquid agents.

TIRE CURING. In order to vulcanize the tire it is necessary to supply heat to the tire externally, and preferably also internally. To accomplish this aim the tire is laid into the mold. This split mold must be held in closed position, while curing, in order to resist the internal pressure supplied by the airbag, and at the same time heat is applied to the external surface of the mold.

The pot heater or autoclave is a vertical cylindrical shell through the bottom of which a hydraulically operated ram furnishes the pressure by which the molds are kept closed. Each bagged tire in its mold is successively placed on the ram, and a suitable connection to the airbag furnishes the interior pressure. The heater lid is locked into position; hydraulic pressure is applied to the ram; air or steam is admitted to the interior of the bag, and steam is then supplied to the heater shell. At the end of the required length of time the steam is turned off; the molds are cooled by water spray; the bag pressure is released, and the heater may then be opened, and the molds removed.

It is customary to carry the molds to and from the heater on heavy gravity roller or table type of conveyers. The sequence of steps in the curing cycle may be man-

ually or automatically controlled. Proper temperature and pressure recording and control equipment provides the required degree of control of the curing conditions.

The individual curing press has the function of supplying heat to the mold and at the same time providing the necessary closing pressure. Heat may be supplied through platens, or the mold itself may carry its own steam jacket. Another arrangement, known as the steam dome, provides a gasketed chamber which opens and closes around the molds. In all cases the molds are bolted to the upper and lower sections of the press, and the closing pressure is supplied by cam action.

These presses, made in both single and dual types, are quite automatic in operation. All that is required of the operator is to place the tire on the bottom mold ring, connect the airbag valve stem to the source of internal pressure, and push the starter button to close the press, start the automatically controlled temperature and pressure cycles, and open the press at the end of the curing cycle.

The Bag-O-Matic press is a recent development in curing presses that dispenses with a separate airbag. The green tire in unshaped form, as it comes from the tire machine, is laid directly over a bladder (a barrel shaped rubber bag) which has upper and lower clamping rings that fit inside the mold rings. As the upper half of the mold is caused to descend and bring the tire beads together, air or steam is automatically introduced into the bladder which then expands, shapes the tire, and forces it into contact with the interior mold surface. Curing then proceeds. At the end of the cure the press opens; the lower clamping ring raises and lifts the tire and bladder from the lower half of the mold; the bladder deflates and is forced into its extended collapsed position by the rise of a center post connected internally to the upper clamping ring. The tire can then be removed over the top of the bladder. This machine does away with the separate airbag and the separate operations of bagging and debagging the tire.

AIRBAG EXTRACTION. With all tire vulcanizers except the Bag-O-Matic, after the cure the airbag must be removed. There are several types of machines for this work. One machine deflects the crown of the tire sufficiently to cause the base of the airbag to extend above the base of the beads where it is caught by a mechanically actuated hook and pulled from the tire. A similar machine works in reverse; a plunger foot pushes the projected airbag out of the tire. Still another type spreads the beads of the tire and thus allows a hook to be inserted partially around the bag, thus pulling it from the tire.

TIRE FINISHING AND INSPECTING. Overflow rinds and vent pips are removed, and the tire is inspected inside and outside by sight and feel. These operations are done on rotatable round-top tables, or the tires may be carried on conveyers equipped with roller arms on which the tire hangs. Necessary buffs and polishing generally precede the operation of spray painting or wiping with a suitable finishing solution.

The tires may be weighed for out-of-balance and classified as required. Wrapping and labeling complete the operation.

Tube Manufacture

TUBE EXTRUSION. Tubes are almost universally extruded from either single-barrel or duplex (opposed barrels with a common head) tubers through a forming die and a hollow mandrel through which talc can be supplied to the interior surface. The continuous length of tube is carried by belt conveyers over weighing scales, and through cooling tanks fitted with either sprays or means

(Continued on page 720)



A. L. Freedlander, Dayton President

Dayton Rubber Co.'s Foreign Technical Service Division

John J. McKenna

THERE is a profitable lesson for the heads of many medium sized American companies in the why and wherefore—and the how—of Dayton Rubber Co.'s foreign technical service division.

The Dayton idea got its start just 20 years ago, in March, 1932, at the very depth of the depression. A. L. Freedlander, president of Dayton Rubber Co., Dayton, O., was worried. He had built up a fine experienced technical staff, responsible for several pioneering rubber innovations. But now, with business at a low ebb, he feared he would not be able to keep his staff together. Once scattered to the four winds, they would be lost to Dayton forever, and he knew it would take years to reassemble a similar top-quality staff.

After many hours thought on the matter Freedlander got an idea. Overseas, in less technically advanced countries were new foreign firms just getting into the rubber business. They lacked American skill and experience. Why couldn't Dayton's own technical staff help? In return, these firms would pay a fee at least sufficient to enable Dayton to keep its technical people busy and paid.

From that beginning 47-year-old Dayton has, in the last 20 years, quietly built up one of the foremost foreign technical service divisions of any United States firm. Its specialists now operate in six foreign countries; they have never lost a contract.

"And," says Freedlander, "while essentially we have been in the business of selling American know-how, we have had it proved to us that the United States has no corner on brains. As a result of our overseas operations, Dayton has gained for its home production operations many a first-class idea."

In effect, Dayton's record has also been a private industry demonstration of the effectiveness of President Truman's Point IV Plan, established and operating long before Point IV was conceived, as such.

Dayton's Foreign Service Has Aided Production

In every case Dayton's foreign technical service division, now headed by Ralph Reel, foreign technical service manager, has aided new, locally organized companies to gain a critically needed production foothold in their native lands, while returning a neat profit to Dayton Rubber. In instance after instance these companies have increased their output beyond original expectations and created new production and sales records.

Unlike most other American firms who operate abroad, Dayton has no investment in any of the companies it serves. Its services, paid for in American dollars, are either on a flat fee basis or on a percentage of sales. [The usual pattern followed in similar instances by other rubber companies takes one of two directions: (1) complete ownership and management of the foreign plant, usually operating under an American name; or (2) a minority stock interest for services rendered with some Americans in the key positions.]

In Dayton's case, however, the firms it undertook to aid were all established companies manufacturing tires, tubes, or other rubber products under their own names. Dayton's trade mark cannot be used. Dayton people do not serve on their boards of directors, nor does Dayton work on their merchandising activities. Instead Dayton's job involves these functions:

1. Helping the firm set up its own production, either from scratch or through expanding and improving existing facilities.
2. Serving as a buying information office, rather than as a purchasing agent.
3. Bringing the overseas firm's people to Dayton's plant to allow them to learn, at first hand, the latest and most modern methods of rubber goods production. Dayton also frequently takes these people to other competing rubber firms, explaining:

"We feel they should have an opportunity to see all the latest developments in this country."

4. Sending its own people to foreign countries to work for a period from a few days up to six months on improvement of local production methods.
5. Continuous service and trouble shooting, and information on the latest developments affecting rubber.

Because everybody in the Dayton plant has, over the years, become familiar with the company's foreign advisory program and is vitally interested in its operation, overseas representatives who visit the plant are given a real welcome. All Dayton employees, from the man who runs the lunchroom to the president of the firm, make them feel a part of Dayton Rubber. Foreign visitors are taken to Dayton homes, see Dayton movies, visit Dayton clubs, and get help in everything from finding a place to buy nylon shirts to finding toys to take back to their children.

Dayton's biggest purchasing, of course, has been in "Made in U. S. A." equipment needed for overseas firms. Some equipment is made to Dayton engineer's own design; while other has been selected on the basis of the company's own experience. Savings on exporters' commissions on some of the multi-million dollars worth of orders Dayton has placed for its overseas clients sometimes equal Dayton's fees alone.

Firms Dayton Has Aided

Dayton first got into the technical advisory service aiding Askim Gummvarefabrik, a Norwegian firm near Oslo, in June, 1934. Askim was then making bicycle tires, boots and shoes, and miscellaneous rubber goods. Dayton helped put it into the automobile tire business. Under its supervision, production has reached a peak of 600 tires a day, 40% of these for trucks. All during the war when communication with Norway was difficult, Askim managed to keep in touch with Dayton. Its correspondence, incidentally, like that of practically all other firms with which Dayton deals, is in English. Most of it is by air mail. Cables are generally used only in handling rush purchases. Practically all Norwegian executives speak English. Others are at least sufficiently familiar with it to carry on correspondence without Dayton's having to translate technical material into a score of languages.

Dayton's second contract was with Cia. Brasileira de Artifacts de Borracha, in Rio de Janeiro, Brazil. This company had a contract with another American company, but in 1946 the Brazilian company decided to extend its tire business. Dayton provided the skill, know-how, and services which enabled Borracha substantially to increase its volume. Borracha is Brazil's only 100% locally owned tire builder. All other manufacturers in the country are branches of foreign firms. It sells its entire output to Brazil.

The third contract was with Denmark's Roulunde Fabriker, located in Odense. Established in the 1800's as a maker of rubber belting, this firm was aided in completely modernizing its operations. Roulunde Fabriker is now the most modern V-belt manufacturer in the area, selling throughout Scandinavia. Dayton know-how also improved production of materials for transmission and conveyor belts so that production was increased without the addition of new equipment.

N. W. Vereenidge Nederlandsche Rubberfabrieken was Dayton's fourth contract. Not without reason, this firm is known as "Hevea," since the longer name is a tongue twister even for the Dutch. Its plant is located near Arnheim, Holland, scene of the famed paratroop battle of World War II. Originally a maker of bicycle tires, boots, shoes, miscellaneous rubber goods, it had a rather old-fashioned V-belt plant. Expanding and modernizing with Dayton's aid, it now has Holland's largest belt division. "Hevea" sells in Holland and to the Benelux countries, but is free to sell throughout Europe. Although the plant was badly bombed during the war, Dayton helped to get the modern machinery necessary for the company to proceed again. All of this effort was financed under the Marshall Plan.

The fifth contract was with Regie Nationale des Usines Renault, the big French automobile maker. Renault, whose plant is near Paris, is France's largest passenger car, truck, railroad diesel, and tractor builder. This company employs more than 25,000 persons and had been making tires for its own use, but felt that it could improve with Dayton's help. Production was increased from 1,200 to the present 2,000 tires daily, all of which are being used as original equipment on Renault cars. Dayton's operation here is based on a flat fee.

The sixth contract, currently being completed, is a variation of Dayton's previous foreign operations. Dayton has signed a 10-year contract to design and give technical aid to the new \$3 million Alliance Tire & Rubber Co., Ltd., in Israel, under a unique arrangement between a group of American investors, some of them Dayton's own customers, and the General Federation of

Labor in Israel (Histadrut). In this enterprise Dayton, for the first time, is receiving its compensation in the form of Alliance stock. Alliance is building a 120,000-square-foot plant at Hadera, between Haifa and Tel Aviv, two of Israel's most important cities. Despite a decision to double the size of the plant, while it is being constructed, work will be finished on schedule in mid-1952. More than 500 tons of machinery, purchased with Dayton's assistance, has been shipped to the Alliance plant.

Plans call for a production level of up to 300-500 tires daily. When the plant's full production potential is realized, capacity will be sufficient to produce 100,000 tires yearly. Alliance will also produce 500 tubes daily and eventually will add mechanical goods and automotive accessories.

All of these rubber products are vitally needed in Israel, which has relatively few railroads and depends primarily on trucks, buses, and private cars for its transport and shipping.

Advisory Service Is Profitable

Dayton's contracts run for a fixed term of from five to ten years. The company feels that any lesser period makes it impossible to develop the increased skills which make the operation worthwhile. Dayton's first presentation of knowledge, background, and information is so extensive that it takes a certain period to get it into operation. Yearly contracts, therefore, would not be worthwhile.

In its continuing operations Dayton provides compounds, improvements it has developed in machinery, information on new developments, etc. In most countries the exchange situation has presented no problems. All contracts made by Dayton are recognized by the local governments. Dayton may also clear its contracts with the United States State Department which, while it never officially approves, can indicate disapproval. Dayton, incidentally, has never had to ask the U. S. government for help in obtaining payment for its services.

The Plan Helps All American Business

Dayton believes that by bringing its 47 years of experience to foreign countries, it has not only aided specific firms, but has helped develop new, responsible industries which have provided needed employment, thereby making each country a better market for American goods, equipment, and ideas.

Says Freedlander: "In addition, we feel the mute testimony of the effectiveness of our training has undeniably helped make people in these countries more receptive to the American way of life.

"In many cases, when contracts were first signed, employees and even officials of the overseas firms were touchy about what they felt was American hustle, bustle and efficiency. Sometimes they apparently had the idea that we would seek to over-Americanize them, not understanding their country was really different.

"I believed from the beginning that we would have to go in not only with engineering advice and assistance, but, like a teacher, try to share our knowledge with others.

"We found a great difference between one country and another. Each followed a varying pace. Each had little quirks and ways of doing things. None were really unusual, when you consider that to them we in the States are sometimes regarded as a little crazy. Often, for example, we think they tie us up in their customs requirements on imported items, while actually our own import-

export restrictions and regulations are often just as involved.

"In almost every case, those who come from abroad to work in Dayton's own plant have been struck by the speed of U. S. workmen. They marvel at the number of labor-saving devices supplied by management, not altruistically, but so that output can be increased for everyone's sake.

"In 1949, our Norwegian associates bought some new truck tire building machines. When our Ralph Reel visited them later, he found production had not gone up.

"'You are just as good workmen as the Americans,'" Reel said. "'I can't understand why production isn't up.'"

Freedlander continued, "This psychological appeal brought a quick response. Some didn't believe production could be as fast as Reel indicated. As a result, the Norwegian union operating in the plant was invited to send two workmen to the United States to personally check time studies and learn methods themselves. They came to Dayton, put on overalls, worked in the plant. Upon their return to Norway, they reported their experience to their fellow workmen with the result that Aars-Nicolay-sen, a leading Norwegian industrialist, later told Economic Cooperation Administration representatives, 'Demonstrating by example did more than anything else to sell our people on how you really operate.'"

Aid Goes Beyond Techniques

In working with overseas firms Dayton frequently has, of necessity, gone beyond mere engineering assistance. In many countries, for example, workers can't earn much above their subsistence level because of heavy taxes and local limitations. The incentive motive which often moves our workers simply doesn't exist in many instances. Dayton representatives have tried to help develop ways whereby workers who produce more gain more. In the course of doing this, Dayton is helping to sell the American free enterprise system abroad.

Bringing men to the United States has prompted many to go back to their own countries strongly enthusiastic about everything American. They spread this contagious pro-Americanism to their fellows, even while practicing the technology they have learned.

According to Freedlander, "We believe our foreign aid operations have proved that a dollar invested in the right way in Europe, the Middle East and the Far East particularly, is worth infinitely more than \$100 in military aid."

Dayton History

Dayton Rubber was incorporated in 1905. It originally was a small manufacturer of specialty rubber goods, but with the growth of the automobile became almost exclusively a manufacturer of tires.

In post-World War I years, however, Dayton officials foresaw the tightening competition for any company that remained exclusively a tire maker.

Dayton wanted to put its overall technical know-how about rubber to more profitable use, while maintaining its tonnage tire business. With tonnage in tires, Dayton had the plant capacity and flow to keep production cost of specialty items down.

The company learned there were at least 25,000 rubber items it could manufacture. Items, however, were secondary to broad fields of activity, wherein technical skill and research would be a big sales factor to sizable consumers. It decided these fields included: (1) me-

chanical rubber equipment like V-belts and hose; (2) products for spinning and weaving operations in textile plants; (3) printing rollers; (4) sponge rubber, which later research led to today's growing latex foamed rubber business.

Dayton Rubber pioneering has resulted in the following achievements:

1908—Built an airless tire.

1913—Built a white sidewall tire.

1921—Introduced to the automobile world a new type of V-fan, generator and water pump belt; also V-belts for all types of industrial applications.

1923—Produced a low-pressure tire, now the largest selling tire.

1926—Built a stabilized balloon tire.

1928—Developed means of providing practical adhesion of rubber to metal.

1930—Produced successful V-belts using a fastener.

1933—Built synthetic rubber printing rollers.

1934—Built a synthetic rubber tire.

1935—Produced oilproof V-belts.

1938—Introduced new textile synthetic rubber parts.

1942—Was one of the leaders in evaluating and processing GR-S in the government-owned plant at Baton Rouge, La. Later, was responsible for much of the development in connection with LTP (cold) GR-S, which is regarded as superior to natural rubber for tire treads.

1946—Installed continuous and electronically controlled multi-processing train for tire manufacture.

1949—Introduced latex foamed sponge rubber pillows (Koolfoam pillows) and now produces a complete line.

1951—Was one of the leaders in the development at the Copolymer Corp. plant of LTP GR-S latex which has most of the desirable properties of natural rubber latex. Copolymer began commercial production in August, 1951.

Facilities and Production at Dayton

Currently, Dayton Rubber employs approximately 3,500 people. Its Dayton, O., home plant operates in 20 acres of floor space on 38 acres of land.

Dayton has a processing capacity of 70 million pounds of rubber, fabric, and other materials annually, can turn out a million V-belts monthly, and 100,000 tires each month. Since 1921, Dayton has produced more than 200 million V-belts.

Its textile and Koolfoam products are manufactured in the Waynesville, N. C., plant, and the company operates another plant in Toronto, Ontario, Canada. Both of these plants are devoted to the production of mechanical rubber goods, and together they employ approximately 1,200 persons.

The continuous and electronically controlled multi-processing train for the manufacture of tires at the Dayton home plant dips, stretches, impregnates, coats, and dries fabric at speeds up to 180 feet a minute. Here also, raw materials are automatically measured and weighed; rubber pellets transported by air to five floors above, and then returned to the first floor in mixed rubber batches for further processing.

Dayton has also helped perfect ultra-modern tire building machines with push-button controls and thermostatically controlled tube splicing machines.

Its new, modern research building contains all the latest equipment for evaluating, testing, and developing new products and methods.

NPA Report on Estimated Rubber Consumption by Products

A memorandum "To All Rubber Consumers," under the date of January 9, 1952, the National Production Authority, through its Rubber Division, has made available estimates of the amounts of various types of

rubbers used in 29 non-transportation products and 32 transportation products.

These estimates were made possible by data obtained from NPA forms NPAF-58 and NPAF-59, "Manu-

TABLE 1. TYPE OF RUBBER AS % OF TOTAL PROPOSED NEW RUBBER CONSUMPTION IN EACH PRODUCT

Third Quarter, 1951 (Estimated)

Item	Product	Prod. Code No.†	% Dry Natural Natural GR-S GR-I (Butyl) Neoprene All Other "Total "New RHC"						
Non-Transportation Products‡									
1	Belts and belting.....	9	52.2	0.1	35.2	*	11.9	0.6	100
2	Hose.....	10	19.1		40.2	1.3	33.3	6.1	100
3	Packing and gaskets.....	11	16.5	3.8	53.5	0.9	15.1	10.2	100
4	Aircraft equipment.....	12a	40.8	0.2	8.7	0.1	33.7	16.5	100
5	Automotive equipment (include automotive mats).....	12b	27.7	0.1	64.0	0.9	5.9	1.4	100
6	Household and appliance products.....	12f	36.7		54.8	1.4	4.4	2.7	100
7	Mats and matting (exclue automotive mats).....	12n	12.4		70.4	*	14.7	2.5	100
8	Hard rubber products (including auto battery containers).....	12p	19.0	1.8	78.5	*	0.2	0.5	100
9	Other miscellaneous mechanical goods.....	12	35.3	0.2	38.9	2.0	14.7	8.9	100
10	Wire and cable.....	13	7.9	0.7	48.7	2.4	39.7	0.6	100
11	Rubber footwear.....	14	68.9	3.3	27.3	*	0.5		100
12	Heels and soles.....	15a	11.9	0.9	82.5		4.1	0.6	100
13	Inner shoe cushions and pads.....	15d	3.0	4.4	80.6	0.1	11.7	0.2	100
14	Cements for shoes and shoe welting.....	15g, h	17.4	47.9	5.6	0.3	26.2	2.6	100
15	Other shoe products.....	15b, c, e, f, i, j, k, l	15.4	8.4	61.4		9.4	5.4	100
16	Cements.....	16	14.1	18.4	28.8	7.2	24.3	7.2	100
17	Proofing, combining, or coating of fabrics.....	17	17.0	1.8	55.2	6.1	12.2	7.7	100
18	Drug sundries.....	18	49.8	29.0	10.0	0.1	10.1	1.0	100
19	Flotation and life saving equipment.....	19, 20	15.8	26.0	0.7		57.5	*	100
20	Bullet sealing fuel cells.....	21	48.5		12.3	*	2.2	37.0	100
21	Athletic goods.....	22a	52.0	1.3	33.1	8.1	5.4	0.1	100
22	Toys and balloons.....	22b, k	26.2	48.8	20.1		4.8	0.1	100
23	Sponge rubber products and rubberized fiber and hair cushioning.....	22c, m	35.0	6.1	52.9	*	6.0	*	100
24	Pressure-sensitive tape.....	22f	59.2	0.5	26.5	0.2	0.3	13.3	100
25	Thread and related products.....	22h	71.5	27.4			1.1		100
26	Rubber flooring and floor covering.....	22L	0.1	2.3	94.7		0.5	2.4	100
27	Other miscellaneous products.....	22	39.0	0.8	48.7	0.6	2.8	8.1	100
28	Latex foam.....	23	0.8	72.0	27.2		*		100
29	All other rubber products.....	24	45.9	4.2	24.4	2.0	9.7	13.8	100
30	TOTAL PROPOSED CONSUMPTION.....		25.7	11.0	47.8	1.0	11.1	3.4	100
Transportation Products§									
Tires									
1	Airplane (large).....	1	96.4	1.7	1.9				100
2	(Small).....	1	98.2	1.0	0.8				100
3	Bicycle.....	1	14.2		85.8				100
4	Motorcycle.....	1	20.4	0.1	79.5				100
5	Passenger thru (6.50) and (7.10).....	1	16.1	0.6	83.3				100
6	Over (6.50) and (7.10).....	1	24.1	0.2	75.7				100
7	Industrial, pneumatic.....	1	20.0	0.1	79.9				100
8	Tractor implements (large).....	1	13.3	*	86.7				100
9	(Small).....	1	12.1	0.1	87.8				100
10	Truck (7.50) and under.....	1	33.1	0.2	66.7				100
11	(8.25) thru (9.00).....	1	65.7	0.2	34.1				100
12	(10.00) thru (12.00).....	1	82.3	0.2	17.5				100
13	Over (12.00).....	1	91.2	0.2	8.6				100
14	Solids—airplane.....	2	70.2				29.8		100
15	Bogies, idlers and support rollers.....	2	4.9		95.1		*		100
16	Pressed and cured on.....	2	47.8		43.2		9.0	*	100
Tubes									
17	Airplane.....	3	99.8			0.2			100
18	Bicycle.....	3				100.0			100
19	Industrial.....	3	12.7			87.3			100
20	Passenger and motorcycle.....	3	3.0			97.0			100
21	Tractor implements.....	3				100.0			100
22	Truck (8.25) and under.....	3	0.3			99.7			100
23	(9.00) thru (13.00).....	3	2.3			97.7			100
24	(14.00) and over.....	3	79.0			21.0			100
Other Items									
25	Valves.....	4	10.3		2.9	86.3	0.2	0.3	100
26	Curing bags.....	4	56.3		*	42.8	0.9		100
27	Tire flaps.....	5	20.4		79.6			*	100
28	Camelback.....	6	10.3		89.7				100
29	Other retread materials.....	6	81.9		8.6	6.8	2.6	0.1	100
30	Tire and tube repair materials.....	7	87.4		12.1	0.4		0.1	100
31	Tank blocks, treads, and band tracks.....	8	18.3		81.5		*	0.2	100
Total Proposed Consumption (Items 1—31).....			34.7	0.2	56.0	9.0	0.1	*	100
32	Master batches or compounds made for and/or sold to others.....		4.9	44.1	33.8		14.1	3.1	100
33	TOTAL PROPOSED CONSUMPTION.....		34.3	0.8	55.8	8.9	0.2	*	100

* Less than 0.05%

† Source: Summary of Form NPAF-59.

‡ From NPA Rubber Order M-2.

§ Source: Summary of Form NPAF-58.

TABLE 2. TYPE OF RUBBER PROPOSED TO BE CONSUMED IN EACH PRODUCT AS % OF TOTAL PROPOSED CONSUMPTION OF THAT TYPE

		Third Quarter, 1951 (Estimated)							
		%							
Item	Product	Prod. Code No.†	Dry Natural	Natural Latex	GR-S	GR-I (Butyl)	Neoprene	All Other	Total "New RHC"
Non-Transportation Products									
1	Belts and belting	9	2.1	*	0.9	*	4.2	0.7	1.3
2	Hose	10	1.2	...	1.5	0.4	17.5	10.7	1.9
3	Packing and gaskets	11	0.7	1.3	1.4	0.2	3.7	12.9	1.4
4	Aircraft equipment	12a	0.2	*	*	*	1.6	2.6	0.2
5	Automotive equipment (include automotive mats)	12b	2.3	*	3.1	0.4	4.2	3.4	2.7
6	Household and appliance products	12f	1.1	...	1.0	0.2	1.2	2.4	1.0
7	Mats and matting (exclude automotive mats)	12n	0.6	0.4	1.5	*	0.1	0.4	1.0
8	Hard rubber products (including auto battery containers)	12p	2.5	0.1	1.6	0.7	8.8	17.7	2.2
9	Other miscellaneous mechanical goods	12	0.7	0.5	2.4	1.0	28.8	1.6	2.7
10	Wire and cable	13	4.0	1.5	1.0	*	0.3	...	1.9
11	Rubber footwear	14	1.3	0.8	5.1	...	3.7	1.8	3.4
12	Heels and soles	15a	*	0.3	0.4	*	0.8	*	0.2
13	Inner shoe cushions and pads	15d	0.2	3.5	*	*	2.1	0.7	0.3
14	Cements for shoes and shoe welting	15g, h	0.1	0.5	0.3	...	0.6	1.1	0.2
15	Other shoe products	15b, c, e, f, i, j, k, l	0.2	1.9	0.2	0.5	2.8	2.7	0.4
16	Cements	17	0.5	0.4	1.0	0.9	3.2	6.7	1.0
17	Proofing, combining or coating of fabrics	18	1.4	6.3	0.2	*	2.4	0.8	0.9
18	Drug sundries	19, 20	*	0.1	*	...	0.3	*	*
19	Floatation and life saving equipment	21	0.4	...	*	*	0.2	8.6	0.3
20	Bullet sealing fuel cells	22a	0.2	*	0.1	0.2	0.2	*	0.1
21	Athletic goods	22b, k	0.3	4.1	0.1	...	0.4	*	0.3
22	Toys and balloons	22c, m	1.9	2.7	1.8	*	2.8	*	1.8
23	Sponge rubber products and rubberized fiber and hair cushioning	22f	1.0	0.1	0.3	*	*	6.2	0.5
24	Pressure-sensitive tape	22h	1.0	3.0	...	...	0.1	...	0.4
25	Thread and related products	22L	*	0.6	1.8	...	0.2	2.2	1.0
26	Rubber flooring and floor covering	22	0.6	0.1	0.5	0.1	0.4	3.6	0.5
27	Other miscellaneous products	23	0.1	57.1	1.6	...	*	...	3.2
28	Latex foam	24	1.2	0.8	0.4	0.2	2.1	9.9	0.8
29	All other rubber products								
30	TOTAL PROPOSED CONSUMPTION		25.9	86.1	28.5	4.8	95.5	97.1	31.8
Transportation Products									
Tires									
1	Airplane (large)	1	1.0	0.1	*	...	...	...	0.3
2	(Small)	1	0.1	*	*	...	...	...	0.1
3	Bicycle	1	*	...	0.2	...	...	...	*
4	Motorcycle	1	*	...	*	...	...	...	*
5	Passenger thru (6.50) and (7.10)	1	8.9	2.4	27.2	...	...	...	17.4
6	Over (6.50) and (7.10)	1	5.0	0.3	9.4	...	...	...	6.7
7	Industrial pneumatic	1	0.1	*	0.2	...	...	...	0.1
8	Tractor implements (large)	1	1.0	*	3.8	...	...	...	2.3
9	(Small)	1	0.3	*	1.4	...	...	...	0.8
10	Truck (7.50) and under	1	6.8	0.3	8.2	...	...	...	6.5
11	(8.25) thru (9.00)	1	13.3	0.3	4.7	...	...	...	7.4
12	(10.00) thru (12.00)	1	21.9	0.4	2.8	...	...	...	8.4
13	Over (12.00)	1	7.1	0.1	0.4	...	...	...	2.5
14	Solid-airplane	2	*	...	...	...	*	...	*
15	Bogies, idlers and support rollers	2	0.1	...	1.1	...	*	...	0.6
16	Pressed and cured on	2	0.5	...	0.2	...	0.8	*	0.3
Tubes									
17	Airplane	3	0.2	...	...	*	...	...	0.1
18	Bicycle	3	...	...	...	1.7	...	...	0.1
19	Industrial	3	*	...	...	0.6	...	...	*
20	Passenger and motorcycle	3	0.3	...	...	48.4	...	...	3.2
21	Tractor implements	3	*	...	...	9.5	...	...	0.6
22	Truck (8.25) and under	3	*	...	...	14.3	...	...	0.9
23	(9.00) thru (13.00)	3	0.1	...	...	16.8	...	...	1.1
24	(14.00) and over	3	0.4	...	...	0.5	...	...	0.2
Other Items									
25	Valves	4	*	...	*	0.8	*	*	0.1
26	Curing bags	4	0.6	...	...	2.3	0.1	...	0.3
27	Tire flaps	5	0.5	...	1.2	...	...	...	0.8
28	Camelback	6	1.6	...	8.4	...	...	0.1	5.0
29	Other retread materials	6	0.8	...	0.1	0.3	0.2	*	0.3
30	Tire and tube repair materials	7	0.6	...	0.1	*	...	*	0.2
31	Tank blocks, treads, and band tracks	8	0.6	...	1.5	...	*	0.2	1.0
Total Proposed Consumption (Items 1-31)			74.0	4.1	70.9	95.2	1.1	0.3	67.3
Master batches or compounds made for and/or sold to others			0.1	9.8	0.6	...	3.4	2.6	0.9
33	TOTAL PROPOSED CONSUMPTION		74.1	13.9	71.5	95.2	4.5	2.9	68.2

* Less than 0.05%.

† From NPA Rubber Order M-2.

Source: Summary of Forms NPAF-58 and -59.

TABLE 3. PERCENTAGE DISTRIBUTION OF PROPOSED NEW RUBBER CONSUMPTION TRANSPORTATION AND NON-TRANSPORTATION PRODUCTS

		Third Quarter, 1951 (Estimated)						
		Type of Rubber As % of Total Proposed New Rubber Consumption in Each Industry Segment						
		%						
		Dry Natural	Natural Latex	GR-S	(GR-I) Butyl	Neoprene	All Others	Total "New RHC"
Non-transportation products		25.7	11.0	47.8	1.0	11.1	3.4	100
Transportation products		34.3	0.8	55.8	8.9	0.2	*	100
TOTAL PROPOSED CONSUMPTION		31.6	4.0	53.2	6.4	3.7	1.1	100
Type of Rubber Proposed to Be Consumed in Each Industry Segment As % of Total Proposed Consumption of That Type								
Non-transportation products		25.9	86.1	28.5	4.8	95.5	97.1	31.8
Transportation products		74.1	13.9	71.5	95.2	4.5	2.9	68.2
TOTAL PROPOSED CONSUMPTION		100.0	100.0	100.0	100.0	100.0	100.0	100.0

* Less than 0.05%.

Source: Summary of Forms NPAF-58 and -59.

(Continued on page 720)

Total
New
RHC"1.3
1.9
1.4
0.2
2.7
1.0
0.2
1.0
2.2
2.7
1.9
3.4
0.2
0.3
0.2
0.4
1.0
0.9
*
0.3
0.1
0.3
1.8
0.5
0.4
1.0
0.5
3.2
0.8

31.8

0.3
*
0.1
*
17.4
6.7
0.1
2.3
0.8
6.5
7.4
8.4
2.5
*
0.6
0.30.1
0.1
*
3.2
0.6
0.9
1.1
0.2
0.1
0.3
0.8
5.0
0.3
0.2
1.067.3
68.2

CTS

Total
New RHC"100
100
10031.8
68.2
100.0

WORLD

Atmospheric Ozone—A Simple Approximate Method of Measurement¹

J. Crabtree² and R. H. Erickson²

IN RECENT years the rubber industry has awakened to the significance of the minute amounts of ozone in the atmosphere as a destructive agent by virtue of its unique property of splitting stretched rubber and perhaps also of the possibility of its function as an oxidation catalyst for organic materials in general.

Progress in the past has been hampered by lack of a satisfactory method of measurement at the extreme dilution encountered (0-10 parts per hundred million).

Particularly does this apply because measurements must be made on the spot. The fugitive nature and high dilution of the ozone obviate any possibility of transporting samples for later measurement in the laboratory.

Of the methods available, the fundamentally ideal is by light absorption at one of the ozone absorption bands. Measurements have been made by European observers in this way giving values of from one to three parts ozone per 10⁸ of air. An air path of three to four miles is necessary, however, and this, apart from other experimental difficulties, renders the procedure hopeless for practical application.

Numerous colorimetric and fluorescence methods have been described, but none begins to approach the necessary sensitivity. Resort, therefore, has inevitably been to the classical reaction with potassium iodide with measurement of the iodine liberated. Here the problems lie in the difficulty of presenting efficiently a very large volume of air to a small volume of reagent, and in the possible presence in the atmosphere of other oxidizing agents, e.g., peroxides—nitrogen, hydrogen, or organic. The volume problem has been solved by presenting the air to the reagent in the form of a fine spray, and apparatus has been described³ to accomplish this action. The hazard of other oxidizing agents is not usually present, but these can usually be frozen out in cooled traps above the boiling point of ozone. It has been claimed⁴ possible to separate the ozone by absorption on silica gel cooled in liquid oxygen and to recover it quantitatively on warming. The present authors, however, have never been able to recover more than 50% of the original ozone in this way. A Russian observer⁵ could recover none.

Ozone Measurement with Stretched Rubber

Because of the variability in concentration of ozone in the atmosphere due to geographical, topographical, or meteorological conditions and to its destruction in smoky or indoor locations, an urgent need has been felt of a method permitting on-the-spot measurements in such

places as warehouses, airplanes, etc. where laboratory facilities, which are essential to the methods referred to, do not prevail. This need can be met in sufficient measure for many practical purposes by using ozone's unique reaction, the cracking of stretched rubber.

This property was used as long ago as 1930⁶ as a test for the occurrence of ozone in the atmosphere, and herein is described an attempt to secure quantitative data using the same principle: namely, the exposure of a stretched piece of rubber to an ozone containing atmosphere and the correlation of the concentration with the time elapsing before cracking could be observed.

If rubber is used with a very high surface gloss, the first indication of ozone reaction is a dulling of the surface in a surprisingly short time, 10 minutes or so, at normal atmospheric concentrations. This surface effect was first used as the indicator, but was finally abandoned because of the failure to devise a compound which would hold its gloss in a stretched state over prolonged periods in the absence of ozone. It was necessary, therefore, to depend on the time elapsing before cracks could first be recognized under magnification. Such a subjective basis is, of course, highly unethical in a quantitative analysis, but seems to be the only acceptable one at current knowledge. With a little practice, however, it is not nearly so objectionable as might appear.

Considerable effort has been expended in devising a compound in which the cracks are of such form and size as to be readily recognizable, appearing first as minute pin-point eruptions which stand out readily from the glossy surface. The compound adopted was:

Smoked sheets	100
EPC black (Micronex W6)	25
Mineral rubber	10
Sulfur	2
Zinc oxide	3
D.P.G.	0.12
Monex	0.50
Cure 80 minutes at 40 p.s.i. steam pressure (287° F.)	

Mold as 0.075-inch thick sheets in a mold with a high surface finish on one side. Immediately on removal from the mold, squeeze a sheet of cellophane into intimate contact with the glossy surface. Sheets thus prepared can be stored for prolonged periods without losing the essential surface quality.

In use a strip 0.25-inch wide is cut with a razor blade and mounted at 50% elongation in any manner desired. As convenient a way as any is the use of a small waxed or varnished board with two holes a short distance apart through which the ends of the strip are passed and secured by pegs or corks. Only about two inches are needed; one six-inch square sheet thus is adequate for a large number of tests. The test strip is exposed thus in the desired location, observed in a good light with a seven or eight times magnifier at five-minute intervals, and the time noted when the aforementioned pin-point discontinuities are first seen. As

¹ Presented before the North Jersey Section, A. C. S., Newark, N. J., Jan. 28, 1952.

² Bell Telephone Laboratories, Inc., Murray Hill, N. J.

³ F. A. Paneth, E. Gluckauf, *Nature*, 147, 614 (1941).

⁴ E. Gluckauf, H. G. Heal, G. R. Marten, F. A. Paneth, *J. Chem. Soc.*, 1 (1944).

⁵ J. Crabtree, A. R. Kemp, *Ind. Eng. Chem. (Anal. Ed.)*, 18, 769 (1946).

⁶ F. A. Paneth, J. L. Edgar, *Nature*, 142, 112 (1938); *J. Chem. Soc.*, 511 and 519 (1941).

⁷ V. Sadikov, *Chem. Abs.*, 34, 5786 (1940).

⁸ W. C. Reynolds, *J. Soc. Chem. Ind.*, 49, 168 T (1930).

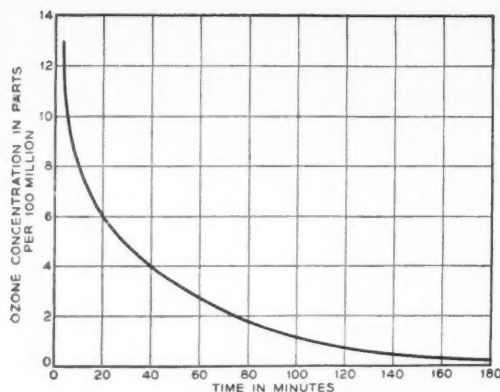


Fig. 1. Calibration Curve for Minutes Exposed Stretched Rubber vs. Ozone Concentration in Parts per 100 Million

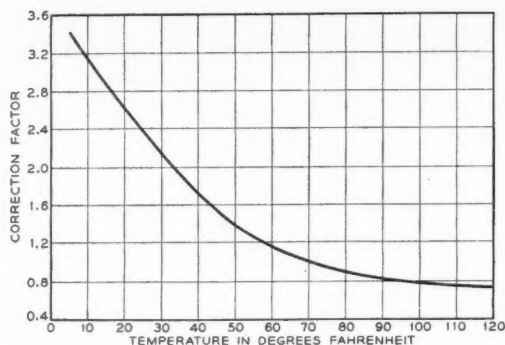


Fig. 2. Temperature Correction Factor for Converting Results at Test Temperature to 78° F. Standard

previously noted, a few practice runs should be made to familiarize the procedure before applying the results.

Calibration and Temperature Correction Curves

The calibration at 70° F. is given in Figure 1 and is applicable only to the compound specified prepared, exposed, and examined in the above manner. Figure 2 is the temperature correction curve. Calibration has been arrived at on the basis of outdoor exposure; simultaneous measurements of ozone concentration by the potassium iodide methods were made. The experimental error, as would be expected, is large and may be as much as $\pm 20\%$ at five parts per hundred million (10^5) and $\pm 40\%$ at one part. This order of accuracy is generally sufficient to indicate whether the ozone concentration at the particular time and location is low, high, or normal. For this purpose only is the method submitted.

From Figure 1 the ozone concentration corresponding to the time observed is derived; this is multiplied by the time factor taken from Figure 2.

After preshaping, the tube is laid in a curing mold (steam-jacketed type) contained in a press, the valve connected to the source of internal pressure (generally air pressure, although steam is sometimes used), and the mold closed. The mold opens at the end of the predetermined curing and deflation cycle.

TUBE FINISHING. After the valve inside has been inserted and tightened, the tube is inflated, inspected by sight and feel, and most generally water tested. The tube may then be cleaned and polished by wetting it with a suitable solution and passing it through a large rotating drum equipped with towels to wipe off the excess solution. The tube is then mounted on a deflating machine whereby the tube is connected to a vacuum line which removes the air. In this flattened condition the tube is easily folded, generally wrapped in waxed paper, and boxed in paper cartons.

Tire and Tube Manufacturing

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to submerge partially the tube in the cooling water.

After cooling, the continuous length of tube is blown free of water by air jets; the tube may be branded; the valve hole punched automatically; the valve applied and jammed, and the tube dusted and cut to correct length. A most modern layout performs all these operations automatically. Naturally, there are many combinations of the operations just described, dictated by requirements of plant layout and equipment available.

The cut-to-length tubes are then spliced into endless form. The hot knife pressure splicer is the most widely used machine.

A variation in tubing procedure should be mentioned. The continuous length of tube is taken from the extruder and passed through a series of cone rollers so positioned as to stretch the crown of the tube and to compress the base so that the tube is delivered as a flat semi-circular form which is cut to the required length.

TUBE CURING. The spliced tube must be preshaped on inflating rings of either the horizontal or vertical type.

NPA Report

(Continued from page 718)

facturers' Quarterly Report of Proposed Consumption," submitted to the Rubber Division by rubber consumers covering proposed consumption of rubber for the third quarter of 1951.

The memorandum signed by Herbert M. James, chief, material consumption and inventories branch, Rubber Division, explains that the data from the NPAF-58 and NPAF-59 forms have been consolidated, and analyses made of them. In order that the rubber industry as a whole may be informed of the results of such analyses, copies were distributed to all reporting companies. India RUBBER WORLD is also recording the data herewith for future reference.

Table 1 shows the type of rubber as a percentage of the total proposed new rubber consumed in each product group. Table 2 shows the type of rubber proposed to be consumed in each product group as a percentage of the total proposed consumption of that type. Table 3 is a summary of Tables 1 and 2.

Any questions concerning the information in the tables should be addressed to S. E. Drimmer, Rubber Division, NPA, United States Department of Commerce, Washington 25, D. C. His phone number is Sterling 5200, Extension 5701.

Editorials

Manpower Utilization in the United States

ONE of the major problems facing the United States today is the proper utilization of its manpower, both technical and non-technical, and at all levels of activity. In recent months we have devoted particular attention in this column to the growing crisis in technical manpower in industry. There is reason to believe that the next few years may be critical ones for industry as far as utilization of all types of manpower is concerned, unless there is a most efficient division of manpower among industry, the government, and the Armed Services.

Whether or not the United States becomes engaged in a full-scale war, or we have Universal Military Training, the continuation of Selective Service for several years as a part of the life of young men in the United States will mean that industry's manpower requirements will have to be satisfied under a different set of conditions than heretofore. In this connection, consideration may have to be given to the problem of how best to use young men with technical or other specialized training, if the industrial production machine is to operate with reasonable efficiency in turning out goods for civilian and military use.

J. E. Trainer, vice president in charge of production for the Firestone Tire & Rubber Co., in a talk before the National Industrial Relations Conference of the Chamber of Commerce of the United States held in Pittsburgh, Pa., on February 12, made some very significant comments on this matter of manpower utilization by industry and the proper division of manpower among industry and the government as well as the Armed Services.

In his talk entitled, "Management Responsibility in Manpower Problems," Mr. Trainer first took the position that the primary responsibility for filling the manpower needs of industry must rest squarely upon the management of industry.

Mr. Trainer also pointed out that there is a tremendous potential for increase in productive capacity in our present labor force, but that there is no magic formula for realizing it. He said it was the responsibility of management to train its own manpower and to train this manpower not only in the mechanical aspects and routines of their jobs, but also in the relation of their jobs to the organization as a whole. Mention was made of the value of quality control programs in increasing the effectiveness of manpower and to safety programs as a means of increasing production efficiency as well as preventing human suffering.

In connection with the hope of Russia that the United States would become mired in socialism and bankruptcy by virtue of our continued reckless spending of our substance and waste of our manpower, the hoarding of man-

power by industry, government, and the military was condemned.

The proposed "National Manpower Program for 1951-1952," as published by the United States Department of Labor under the date of June 18, 1951, contains several examples of the tendency of government to encroach needlessly upon management in the manpower field, Mr. Trainer said.

"The establishment of joint programs for such ends as promotion of desirable standards and working conditions in defense plants," as outlined in the Labor Department's program was particularly objected to as an indication why Federal Government non-military personnel is so large—accounting for one-twenty-fifth of the nation's employment.

The World War II practice of attaching manpower conditions to the granting of government contracts was also objected to since it provided a means whereby the government could exercise economic control over many companies through allocation of defense contracts.

Organized labor, too, capitalizes on mobilization opportunities to achieve new goals for encroaching upon management's field, Mr. Trainer pointed out. The Report of the Resolutions Committee, 13th Constitutional Convention of the CIO, held in New York, N. Y., November 5 to 9, 1951, included Resolution No. 21, entitled, "Industrial Planning and Industry Councils," which read in part as follows:

"The necessity and soundness of such industrial planning, with participation of organized labor, farmers, consumers and management . . . has been proved in World War II . . .

"Experience in this field has shown that the industrial policies which should be brought under *democratic direction* by such methods include among others . . . firm wages and hours *floors* for industrial workers, stable price *ceilings* to protect purchasing power and guard against inflation, and decisions on *production levels*, on the *rate and nature of capital investment*, on the *rate and nature of technological change*, on the *size and location of industrial plants*. . ." [Italics Mr. Trainer's.]

India RUBBER WORLD agrees completely with Mr. Trainer's conclusions when he says, "If we are to continue to enjoy freedom, we must speak out, and act now. We must reaffirm, over and over, the conviction that there are fundamental principles of right, of justice, and of good management that do not change. In our defense of these principles and in the solution of manpower problems facing us, lies opportunity as well as responsibility."

R. G. Seaman

DEPARTMENT OF PLASTICS TECHNOLOGY

The Injection Molding Cycle

G. D. Gilmore¹

THE fabrication of plastics, particularly the injection molding process, has made remarkable progress in the past 15 to 20 years. Now what of the future? Will this process continue to grow, or will it soon reach the point of diminishing returns? While its growth has been rapid in the past few years, the process itself dates back to 1870. At that time injection molding received its start with the development of the first commercial synthetic plastic-cellulose nitrate. Credit is given to John Hyatt for its development.

To fabricate this material Hyatt also developed what he called a stuffing machine. This machine consisted of a steam-heated chamber, a hydraulic operated plunger, and a discharge nozzle. After the cellulose nitrate was heated in the chamber, the plunger forced the material through the discharge nozzle into a cylindrical mold. The temperature of the mold was controlled to solidify the material, thus forming a rod. This material was hazardous and difficult to handle and apparently was not available in large quantity.

Very few new developments appeared in the injection molding process in the early years because of the material situation. The introduction of cellulose acetate in commercial quantities during the period of 1925-1930 provided the incentive for new developments in the injection molding process. In the past five years the size of machines and molds has shown phenomenal growth. Will the future show continued progress?

The situation seems similar, in many respects, to the early years in the development of the steam engine. Like the steam engine cycle, the injection molding process is one which involves pressure and temperature. Also, like the steam engine process, future progress will depend upon a thorough understanding of the relations of these and other variables in the cycle. The understanding will come about

by piecing together bits of information which in themselves seem unimportant but, when properly oriented, provide a very clear picture of what is involved in the process.

These pieces of information may be of immediate practical importance or may be based on laboratory experiments or theory with no direct practical use. However classified, these data will for the most part be useful in time. It is important, then, to give considerable thought to any experimental or theoretical information which may increase our understanding of the process. The following information is presented for that purpose.

Expansion, Compressibility, and Mold Shrinkage

Information on the properties which define a thermoplastic and are involved in its fabrication arises largely from laboratory experiments. Thermal expansion is one of these properties. A sample of polystyrene with a volume of one cubic inch at room temperature will increase in volume as the temperature is raised, as shown in Table 1. At 500° F. the volume has increased approximately 10%.

TABLE 1. THERMAL EXPANSION OF POLYSTYRENE AT ZERO PRESSURE

Temperature, (° F.)	Volume, (Cu. In.)
75	1.000
350	1.068
400	1.081
500	1.106

Another important property is compressibility. A sample of polystyrene which has a volume of one cubic inch at room temperature and is then heated to 350° F., will decrease in volume with the application of pressure, as shown in Table 2.

¹Plastics technical service, Dow Chemical Co., Midland, Mich.

TABLE 2. COMPRESSIBILITY

Temperature—350° F.	
Pressure (Psi.)	Volume (Cu. In.)
0	1.068
2,000	1.057
4,000	1.047
6,000	1.034
8,000	1.026
10,000	1.019

Heating the material to 350° F., as indicated in Table 1, increased its volume by approximately 7%. Table 2 shows that applying a pressure of 8,000 psi. reduced this volume increase to approximately 2½%.

To see how these two properties fit into the injection molding cycle, assume a cavity whose volume is 1.068 cubic inches. If polystyrene is introduced into this cavity at 350° F. and zero pressure, then cooled to room temperature, the plastic volume will decrease to one cubic inch. The linear shrinkage is 0.021-inch per inch. If a cavity whose volume is 1.019 cubic inches is used, and polystyrene introduced at 350° F. and 10,000 psi., the material again cools down to a volume of one cubic inch. In this latter case, however, the linear shrinkage is 0.006-inch per inch. It is apparent, then, that the temperature and pressure existing on the material in a cavity determine to a large extent, the mold shrinkage. These properties of expansion and compressibility are related and can be combined in an equation of state for polystyrene:

$$(P+27,000)(V-1.422) = 11.18T+5.134$$

Mold Pressure Cycle

Information on the pressure existing in the mold cavity during the injection cycle should also be helpful in understanding the process. Such measurements have been made in the laboratory,² and in Figure 1 is shown a typical mold pressure cycle. Several significant points are

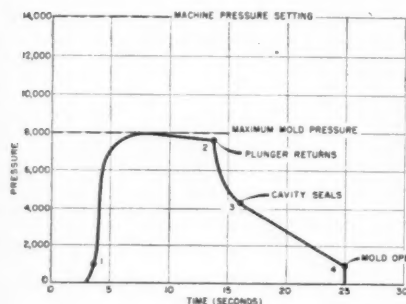


Fig. 1. Typical Mold Pressure Cycle Diagrams for Polystyrene

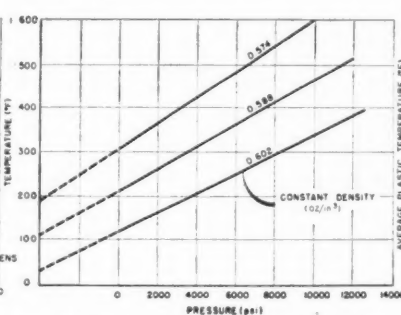


Fig. 2. Pressure, Temperature, and Density Relations for Polystyrene

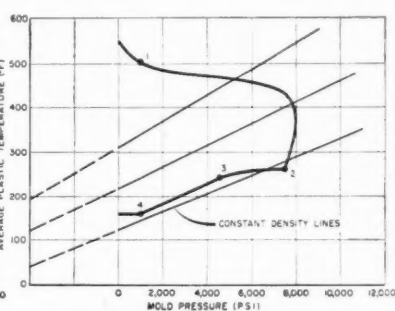


Fig. 3. Polystyrene Mold Pressure Cycle on a Pressure-Temperature Plot

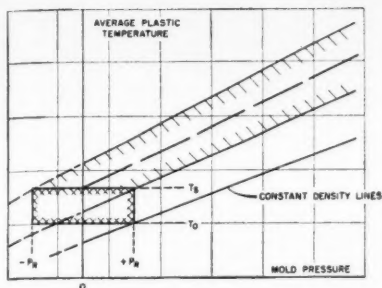


Fig. 4. Pressure-Temperature Relations in the Polystyrene Injection Cycle Determined by Mold Opening Conditions

to be noted in this mold pressure cycle. At zero time the plunger starts forward, and at point 1 the mold has been filled with the pressure as shown existing in the cavity. Immediately thereafter the pressure builds up to a maximum and then gradually falls off until at point 2 the plunger is returned.

Between points 1 and 2, material is flowing into the cavity at a relatively slow rate. This period of the cycle has been termed "packing" and is a very important part of the injection cycle when frozen strains in molded pieces are considered. The maximum mold pressure is somewhat less than the machine pressure setting, as might be expected. At point 2, when the plunger returns, the pressure in the cavity drops very rapidly until at point 3 the pressure starts decaying at a much slower rate.

Between points 2 and 3, polymer is flowing from the cavity of the mold back into the heating chamber. In going from point 2 to point 3 the flow is rapidly decreasing until at point 3 the flow is slow enough so that the polymer flowing through the gate has time to freeze before leaving the gate. The period between point 2 and point 3 has been called the "discharge."

From point 3 to point 4 the cavity is sealed, and flow of polymer into or out of the cavity has ceased. Point 3 is a very important part of the cycle in that the pressure and average temperature of the plastic in the cavity at this instant determines what the average mold shrinkage shall be. At point 4 the mold opens, and the pressure immediately drops to zero. The pressure at point 4 has been called the "residual mold pressure." If this pressure is too high, the molding scores or breaks on ejection, or possibly the mold may be frozen shut.

This mold pressure cycle was obtained using a relatively thick wall section and a fairly large gate. Other mold cavities with different section thicknesses would give quite different pressure cycles. In mold cavities with relatively thin sections and large areas, one would expect these pressure cycles to be quite different, as determined in different points in the cavity. This mold pressure cycle is in reality a picture of what goes on within the cavity during the cycle.

Adding the equation of state to the picture already presented provides the necessary background for a more general picture. The information contained in the

equation of state can be pictured as in Figure 2. Here is a plot of temperature vs. pressure with constant density lines. Following any one of these lines, with the pressure and temperature increasing, the density of the material remains constant. On a constant pressure line, with increasing temperature, the density decreases. While the mold pressure cycle shows the relation between pressure and time, it is also a relation between pressure and temperature. For any given mold cavity there is a definite relation between temperature and time taken from the cooling characteristics of the mold and the polymer.

It is possible then to redraw the mold pressure cycle on the pressure-temperature plot as in Figure 3. The mold pressure cycle is now distorted somewhat since the temperature falls most rapidly at the beginning of the cycle where the temperature gradient is the greatest. Again, on this plot there are constant density lines as mentioned previously. At point 3 the cavity seals. At this instant there is a given mass of material in the cavity as determined by temperature and pressure, with the volume being constant. Since the condition is one of constant density, the line between point 3 and point 4 should fall into the family of constant density lines as shown. This then makes the picture a little clearer as to what goes on within the cavity.

Injection Cycle Diagram

In more general terms, with reference to Figure 4, still more can be added to this picture. Certain requirements must be met at the instant the mold is open. First of all, the piece must be rigid enough to hold its shape, which defines some set-up temperature, T_s , as shown in Figure 4. The mold is controlled at



Fig. 5. Specimens Cut from Molding and Relaxed at 212° F.: Specimen A (Left) Had Its Orientational Strains Machined off before Heating; While Specimen B (Right), in the As Molded Condition, Shows Distortion Owing to Orientational Strains

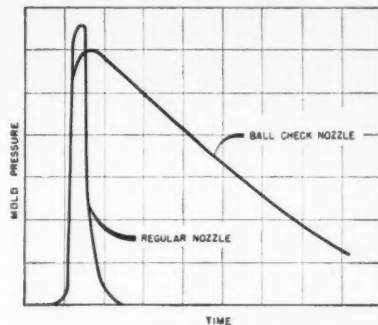


Fig. 6. Comparison of Mold Pressure Cycles When a Regular Nozzle and a Ball Check Nozzle Were Used

some temperature, T_o , and the molding could not be cooled below this temperature in the mold. These are two temperature limits defining wherein the mold must be opened.

On the pressure scale, as previously stated, the maximum residual mold pressure is established if one is to avoid sticking or breaking the piece on ejection, and is defined as P_r in the figure. The pressure in the mold, then, must be less than P_r when the mold is open. In a mold containing a core there is also a negative P_r beyond which sticking will occur on the core or insert.

The two pressure and temperature limits then define an area within which the mold must be opened. As previously noted, this region is approached along a constant density line. Constant density lines are then constructed from the extreme corners of the defined area in Figure 4. Since there would be no need of cooling the piece below the temperature, T_s , it is only necessary to consider the area bounded by the constant density lines which intersect the corners along the temperature limit, T_s . Further, to minimize sticking or scoring, it would be necessary to follow along the constant density line which intersect T_s at zero pressure. In molding set-ups which are operating with no sticking or scoring and close to a minimum cycle, conditions in the cavity must necessarily follow along this latter line.

Figures 2, 3, and 4 give us only a partial picture of what goes on during the injection molding cycle and are in no way complete. The intention is to indicate a possible approach to be followed in assembling pieces of information to build an understanding of what takes place during the injection molding cycle. Because of the complexity of most molds, the variables can only be thought of in terms of average values, if such can be defined. Only in the very simplest molds can average conditions be defined with any degree of success.

Frozen Orientational Strains

Up to this point the discussion has been along more or less theoretical lines. While such a line of thought may be helpful in the long run, it has little direct application. Of more direct and immediate value is the following information on frozen orientational strains in molding.³ All too often there have been moldings which show cracks and craze lines after a short period of useful life. This defect is, no doubt, the result of a highly strained condition in the molding. The high strain also exhibits itself in the form of distortion when the temperature is raised above

² "The Role of Pressure, Temperature, and Time in the Injection Molding Process," G. D. Gilmore, R. S. Spencer, *Modern Plastics*, 27, 8, 143 (1950).

³ "Residual Strains in Injection Molded Polystyrene," R. S. Spencer, G. D. Gilmore, *Ibid.*, 28, 4, 97 (1950).

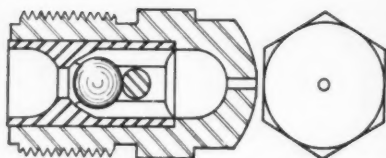


Fig. 7. Cross-Sectional Drawing of Ball Check Nozzle

some critical value. This highly strained condition extends from the molded surface into the cross-section of the piece.

Proof of this effect is shown in Figure 5. Here are two specimens cut from a molding at the gate, in which each contains half of the gate area. The molded surfaces of specimen A were machined off, and then both were exposed to a temperature of 212° F. for a short time. Specimen B, which was left as molded, shows a considerable amount of distortion, while specimen A is distorted very little.

Further evidence of this highly strained skin and its causes were shown in an investigation of specimens cut from moldings made with different plunger forward times. As the plunger forward time increased from 7-13 seconds, the distortion resulting from reheating increased as did the thickness of highly strained skin.

To explain this highly strained condition it is necessary to introduce some theory by considering the cross-section of a mold cavity into which a polymer front is moving. That polymer which comes in contact with the cavity wall stops and forms a relatively thin cold layer. Immediately adjacent to this cold skin is relatively hot material moving to fill the cavity. This action tends to stretch or orient a layer of polymer adjacent to the cold layer. Since cooling is going on at the same time, this stretched or oriented material becomes frozen almost immediately, forming the frozen orientational strains.

Once the cavity is filled, if you will recall the mold pressure cycle, the polymer still continues to flow into the cavity at a slow rate during the packing period, and the formation of this strain continues. The strain continues to form for as long as the polymer is moving adjacent to a layer of cold polymer. The longer plunger time or packing period, therefore, produces a thicker strained layer. This strain may be so great that the molding will crack or craze even before it is packaged or assembled. Obviously it is desirable to minimize these strains in the moldings.

Weigh Feeding and the Ball Check Nozzle

Several molding techniques have proved successful in reducing orientational strains. They are all concerned with sealing the cavity, as soon as possible, after filling. The technique which has been used for some time now is the restricted gate. The smaller the gate area, the sooner it performs its function of sealing the cavity. This, in effect, shortens the plunger or packing time. In many molding jobs, a small restricted gate is the best molding technique to use.

An improvement over this procedure or technique, particularly with the heavier sections, is to seal the cavity mechanically. This sealing can be done in one of two ways: first, by means of a ball check nozzle; and, second, by the use of weigh feeding. Both methods serve the same purpose in that they mechanically seal



Fig. 8. Comparison of Moldings Made under Identical Conditions Except for the Nozzle Used. A (Left) Ball Check Nozzle; B (Right) Regular Nozzle

the cavity, but weigh feeding also gives slightly greater uniformity in operation. Because of the lack of specific data on weigh feeding, the discussion will center on the operation of the ball check nozzle.

Figure 6 shows a mold pressure cycle in which comparison is made between molding with a regular nozzle and a ball check nozzle. Molding conditions were identical in both cases. With the regular nozzle, the pressure dropped considerably when the plunger was returned, leaving a piece with large sink areas. With the ball check nozzle, the pressure remained in the cavity and declined gradually. This latter molding was entirely acceptable in that it had no sink areas and reproduced the cavity faithfully. Both moldings have the same degree of strain.

The ball check nozzle used in this test is shown in Figure 7. It is simple in design and has the same outside dimensions as a conventional nozzle. As the polymer flows into the cavity, the ball moves forward; its motion is limited by the pin. When the plunger is returned, the polymer causes the ball to move against the seat, sealing off the cavity.

In Figure 8 are shown cross-sections of two moldings. Molding A was made with a ball check nozzle; while molding B was made with a regular nozzle. Molding conditions for both were identical. Notice the large sink area under the lip in specimen B. To eliminate this sink area and produce a section similar to molding A with a regular nozzle would require a considerably longer plunger time, with a resultant highly strained condition in the piece.

A more complete comparison of the ball check and the regular nozzles is shown in Table 3.

TABLE 3. COMPARISON OF IDENTICAL PARTS MOLDED BY BALL CHECK AND REGULAR NOZZLES

Molding No.	Type of Nozzle	Plunger Time (Sec.)	Wt. of Mold Grams	Mold Shrinkage, In./In.	No. of Fringe Lines	Remarks
1	Ball check	5.0	148.07	0.0052	1	Small sink areas
2	Ball check	6.0	150.44	0.0044	1	Small sink areas
3	Ball check	6.5	151.00	0.0040	1	Very little sink
4	Ball check	7.0	151.38	0.0036	5	Acceptable; no sink
5	Ball check	7.5	151.71	0.0032	6	Acceptable; no sink
6	Ball check	8.0	152.48	0.0020	7	Acceptable; no sink
7	Ball check	9.0	152.99	0.0012	9	Scoring; poor release
8	Regular	10.0	145.60	0.0060	8	Very large sink area
9	Regular	12.0	146.77	0.0052	10	Very large sink area
10	Regular	14.0	147.98	0.0032	14	Sink areas reduced
11	Regular	16.0	149.63	0.0044	16	Large sink at gate
12	Regular	17.0	150.39	0.0044	21	Small sink at gate
13	Regular	18.0	151.22	0.0036	24	Acceptable; no sink
14	Regular	19.0	151.82	0.0032	26	Acceptable; no sink
15	Regular	20.0	152.52	0.0020	23	Scoring; poor release

Molding conditions in all cases were the same, except for the plunger forward time. For moldings 1-7 a ball check nozzle was used. As would be expected, the weight of the box increases as the plunger time increases and the mold shrinkage decreases. Under fringe lines is shown the number of dark bands, observed under polarized monochromatic light, for a given distance from the gate. The greater the number of fringe lines, the more highly strained is the piece. Under comments, notice that as the plunger time is increased, the sink areas become smaller until an acceptable piece is made. The last molding (number 7) scored and gave very poor release.

Using the regular nozzle, eight moldings (numbers 8-15) were prepared with increasing plunger forward times. Here, again, the weight of the molding increased as the plunger time increased and the mold shrinkage decreased. The degree of strain increased very greatly. Under comments, there are large sink areas; small sink areas; two acceptable pieces; and, finally, at a 20-second plunger time the piece scored with poor release.

To produce an acceptable molding with the ball check nozzle required a plunger time of only seven seconds; while with the regular nozzle 18 seconds were required to produce an acceptable piece. The strain in the piece produced with the regular nozzle was approximately four times that found in the molding produced with the ball check nozzle.

Four of these moldings were subjected to a hot and cold cycling test. After 480 cycles going from 70 to 170° F., the boxes molded with the regular nozzle showed considerable cracking and crazing; while those molded with the ball check nozzle showed very few craze marks. Here, then, is a very effective method of reducing frozen orientational strains in injection moldings.

Summary and Conclusions

This information is by no means all that is available on the injection molding process. Some of the information to be found in the literature has immediate practical value and, as such, leaves little room for discussion. Other information will be found, based largely on theory, that is useful only insofar as it promotes thinking and discussion. Examples of these types of information have been presented in this paper.

Volume changes produced in polystyrene by the application of heat and pressure provide an explanation of mold shrinkage. This relation of pressure, temperature, and volume, combined with actual pressure measurements in the mold cavity, present a picture of conditions in the cavity. At least four separate and distinct phases

are involved. The use of criteria established in producing an acceptable molding suggests an approach toward developing a more general picture. Applying the above analysis, in part, has resulted in new techniques for reducing frozen orientational strains.

But what of the future in the injection molding process? The limitations which appear to be present do not provide a firm basis for predicting a continued rapid growth. On the other hand, these limitations could well be the result of an incomplete understanding of the fundamentals involved. If this is the situation, there is opportunity for continued progress. This progress, however, will be in direct proportion to that information which promotes a better understanding of the process.

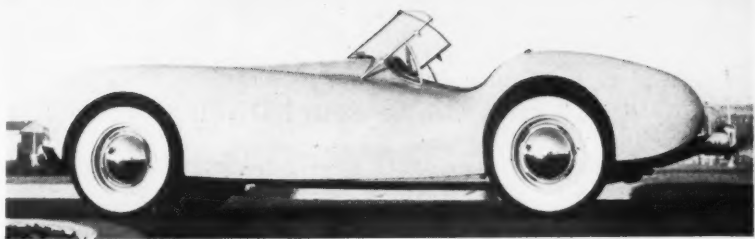
Urea Resin Adhesive

A NEW resin adhesive that can be engineered to meet the requirements of a wide variety of cementing jobs has been announced by Monsanto Chemical Co., Springfield, Mass. Designated Lauxite UF-71, the new product is a powder urea formulation that can be modified to meet the different gluing specifications that previously necessitated large inventories of different types of glues. Unlike many other adhesives the new product has exceptional storage stability and is unaffected by sharp temperature fluctuations and prolonged storage periods, it is also claimed.

Lauxite UF-71 is available in pure resin form. All necessary catalysts, hardeners, and fillers can be added by each user at the time of use. An outstanding economic advantage of the adhesive is that fillers less costly than conventional urea resin fillers are recommended. In addition to its usefulness in plywood work and assembly gluing, the new product promises to be the preferred binder in the manufacture of granulated wood products for consumer and industrial use.

Vinyl Resin Latex

PLIOVIC LATEX 300, the first in a series of new vinyl resin latices, is now being produced on a commercial scale by Goodyear Tire & Rubber Co., Akron, O., in the Niagara Falls N. Y., plant of its subsidiary, Pathfinder Chemical Corp. According to H. R. Thies, manager of Goodyear's chemical division, the new product is an aqueous dispersion of a vinyl chloride copolymer. Results of a preliminary testing program indicate that the new latex should find wide use in the textile and paper coating industries because of the greaseproofness, chemical resistance, and resistance to moisture it imparts to fabrics and papers. Other uses are as pigment binders for inks and paints, binders for non-woven fabrics and felt, and as sizings for textiles. Vinyl latices are less costly to use than other vinyl dispersions, and, since they do not include volatile solvents, present no processing problems of toxicity or inflammability, it is also claimed. Since water penetrates fibers more completely than do other dispersing media, the compounded latex will form a very thin film of more complete continuity and with better adhesion to the textile or paper fiber.



Glass-Plastic Sports Car Body Shown Mounted on Separate Chassis

Plastic Auto Body

THE first commercial production of a low-cost plastic automobile body has been announced jointly by Glasspar Co., Costa Mesa, Calif., and Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn. Constructed of Naugatuck's Vibrin polyester plastic and layers of glass fiber, the body is said to be dent-proof, rustproof, and stronger than steel on a weight for weight basis. Produced by Glasspar, the body is currently available in a custom sports-car design which fits a frame with a 100-inch wheelbase and is sold for mounting on the separately purchased chassis. As production increases, a variety of body styles is expected to be made available to fit various frames.

Molded in one piece, the body is approximately 2/10-inch thick, weighs only 185 pounds, is strong and resilient, and will not dent under the punishment of accidents which result in crumpling of metal fenders and doors. Because of its resiliency the Vibrin-glass combination springs back to its original shape after impact. Breaks are possible under heavy impacts, but the material can be repaired easily and cheaply. In a test, a car was deliberately driven into a tree at a speed of 25 miles an hour, resulting in a crack approximately 14 inches long at the point of impact. This crack was repaired with a patch of glass fiber and plastic within one hour.

A demonstration car is to be shown to the public for the first time at the National Plastics Exposition in Philadelphia, Pa., on March 11-14. The car is being driven in from the West Coast by Earl E. Ebers, Naugatuck's sales manager for Vibrin plastics, who worked in close cooperation with Glasspar engineers in the initial stages of production. The present sports-car body was designed by Glasspar President William Tritt.

"While the Vibrin-glass auto body is not yet ready for production on a mass scale for the motoring public, this sports body represents definite progress toward that goal," said John P. Coe, vice president and general manager of Naugatuck.

New Vinyl Dispersions

AFTER five years of research in vinyl plastics and their application to the manufacture of light products, Watson Standard Co., Pittsburgh 30, Pa., has announced the availability of the following five basic dispersion products: (1) Organosol; (2) Plastisol; (3) Foamosol; (4) Rigidol; and (5) Plastigel. Although each dispersion has specific types of application, their overall features include simplicity of manufacturing process, fabrication without the use of high pressures, and competitive prices.

Organosol, basically used for film coating; contains volatile solvents. Plastisol, more varied in usage, is a 100% total solids material containing appropriate stabilizers, pigments, and other modifiers. Typical Plastisol products include doll parts, play balls, small squeezable bottles, unsupported gloves, coverings for small hand-tools, wire basket coverings, and others. Foamosol has the appearance and physical properties of foam rubber, can be made in a variety of colors, and is applicable to the manufacture of upholstery cushioning, bedding, floor padding, clothing, and shoes. Rigidol, used primarily for molding and casting, is rigid yet sufficiently pliable to be tough. Industrial applications include gaskets, tubing, hose, and flexible bottles. Plastigel, designed for casting and extrusion, is a dispersion containing a gelling agent which can be preformed, molded, or sculptured and then cured at kitchen oven temperatures.

SPE Sections Meet

THE first regular dinner-meeting of the year of the New York Section, Society of Plastics Engineers, was held February 20 at the Gotham Hotel, New York, N. Y., with a near-record attendance of 115 members and guests. Featured speaker at the technical session was Henry W. Wehr, Dow Chemical Co., whose topic was "Styron Technology of Injection Molding." Mr. Wehr dealt with the organization of Dow's plastics work and then went on to describe some of the work done on the injection molding cycle for polystyrene, as discussed by G. D. Gilmore (see page 722). Also shown was the Dow film, "Inside the Injection Mold," which demonstrates flow characteristics of styrene under different conditions of temperature, pressure, nozzle opening, and plunger dwell time, and around various types of inserts.

Committee chairmen for 1952 were announced in the business session preceding the technical talk, as follows: program, Harold Schwartz, Empire Brushes, Inc. (to June 30); membership, R. M. Thews, Monsanto Chemical Co.; credentials, George Baron, Ideal Plastics Corp.; house, William Lewi, Dusal Tool & Mold Co.; favors and prizes, R. H. Skidmore, Celanese Corp. of America; employment, G. Palmer Humphrey, manufacturers representative; and publicity, A. M. Merrill, India RUBBER WORLD.

Section President B. E. Wessinger, Wess Plastic Molds, Inc., welcomed the guests present, including a 16-man United Kingdom Plastic Molding Productivity Team delegation, here to study the American plastics industry under the sponsorship (Continued on page 780)

Scientific and Technical Activities

Akron Group Panel Discussion on Reclaimed Rubber

THE winter meeting of the Akron Rubber Group held at the Mayflower Hotel, Akron, O., February 1, was featured by a panel discussion on reclaimed rubber and attracted another record attendance of 675 members and guests for the afternoon technical meeting and the evening dinner-meeting that followed. D. F. Behney, Harwick Standard Chemical Co., Group chairman, presided at the evening session, and Henry M. Rose, H. Muehlstein & Co., Inc., was moderator for the panel discussion and in charge of the entertainment in the evening, when gridiron skits were presented lampooning certain prominent members of the Group.

The Dinner-Meeting

The French Rubber Industry Productivity Team, headed by Jacques Baratte, Ets. Pincet & Baratte, Puteaux (Seine), was guest of the Group at both parts of the meeting. This team, sponsored by the Mutual Security Agency, was being conducted on its tour of important rubber centers in this country by James V. Foley of the M.S.A. as project manager. Mr. Foley pointed out at the dinner-meeting that permission to visit the several rubber goods manufacturing companies had been obtained with the help of The Rubber Manufacturers Association, Inc., and the companies themselves. He emphasized that the expense of bringing the team to the United States and returning them to France was defrayed by the French Government.

M. Baratte introduced the members of the French Team to the audience, acknowledged the honor of being guests of the Akron Group for the meeting, and said he hoped that their trip would enable them to have many future contacts with members of the American rubber industry.

Waldo Semon, B. F. Goodrich Research Center, and chairman of the Division of Rubber Chemistry, A. C. S., spoke briefly on the meetings of the Division to be held in 1952 and urged members to present papers at either or both of the meetings. The spring meeting is to be held in Cincinnati, O., April 30, May 1 and 2, and the fall meeting in Buffalo, N. Y., October 29 through 31.

Seward Byam, E. I. du Pont de Nemours & Co., Inc., vice chairman of the Division, also talked on his liaison work between the Division and the local rubber groups, the desirability of membership in the Division, and the recently established Library of the Division at the University of Akron.

Behney next announced that W. Phil Sauter, du Pont, had been appointed chairman in charge of arrangements for the summer outing of the Group and then called on E. L. Stangor, also of du Pont, for the nominations for officers for the period beginning September, 1952. Those nominated were: chairman, L. M. Baker, General Tire & Rubber Co.; vice chairman, K. J. Kennedy, B. F. Goodrich Co., and R. H. Marston, Binney & Smith Co.; secretary, K. R. Garvick, Firestone Tire & Rubber Co. and V. L. Petersen, Goodyear Tire & Rubber Co.; and treasurer, Fred W. Gage, Columbia-Southern Chemical Corp. and George Hackim, General Tire.

It was announced that the Akron Group,

as of February 1, had 1,241 members.

Hackim directed the drawing for the door prizes, and the first prize of \$15 in silver was won by Henry Zimmerman, American Hard Rubber Co., and the second prize of \$10 in silver went to R. J. Crowsom, Goodyear. Five pairs of tickets to the "Curious Savage," to be presented by the Center Theater Guild, were won by F. W. Fairchild, Xylos Rubber Co.; C. E. Carlson, General Tire; C. A. Ritchie, Goodrich; T. H. Fitzgerald, Naugatuck Chemical Division, United States Rubber Co.; and George H. Wallace, Firestone.

Behney thanked Henry Rose and the panel members for their work in connection with the afternoon program and then turned the entertainment part of the evening meeting over to him.

Mr. Rose, S. H. Berloff, and Jack Magilavy, of the Center Theater Guild, a theatrical group from the Akron Jewish Center, then presented the very amusing skits highlighting some of the activities of Group Members Larry Baker, Roy Marston, George Hackim, Chairman Behney, L. V. Cooper, Paul Gamble, and Paul Fisher.

The skits featured the problems of Baker and the Cadillac car he purchased from his company, General Tire; the "free" tickets distributed by Marston, Group ticket chairman; the triplets with which Hackim and his wife had recently been blessed; Behney as the "best salesman and buyer" in the industry; Cooper, as outing chairman, and the problem of the missing prizes; and Paul Gamble, Xylos, and Paul Fisher, Goodyear, as "one reclaimer entertaining another."

The Panel Discussion

Mr. Rose introduced the members of the panel on reclaimed rubber and added that all members were from the Akron area except Jean Nesbit, U. S. Rubber Reclaiming Co. Panel members were Wm. Welch, Midwest Rubber Reclaiming Co.; Carl R. Shaffer, Xylos; T. A. Johnson, Goodyear; Earl Busenberg, Goodrich; and Mr. Nesbit.

Rose explained that all members of the Group had been sent cards inviting them to send in their questions on reclaimed rubber, and these questions were then distributed to various members of the panel in advance of the meeting.

The questions and answers follow:

Q. How many pounds of reclaim can be made from a ton of giant tire scrap and from a ton of passenger-car tire scrap?

A. Busenberg. Based on our figures and the way we handle the two types of scrap rubber, three-quarters of a ton of reclaim should be produced if no pigment or other additive is used. The whole tire, bead and all, is ground so that practically the only loss is the wire and the cotton material destroyed and removed.

Q. What type of reclaim will give the best tread wear when used in tire treads?

A. Johnson. Five or more years ago I would have said tread peel reclaim, due to its higher abrasion resistance and higher free carbon content, but with the advent of black loading in the carcass of

tires, I don't think you will find very much difference today between tread and carcass reclaims in tread wear.

Q. What blends of scrap are used in making whole tire reclaim?

A. Shaffer. In general, whole tire reclaim is made from passenger or truck tire scrap. Blends of peelings, sidewalls, etc., can be blended together, however, to make whole tire reclaim.

Q. When you extend rubber do you degrade it? In other words, when you add reclaim to a batch, does the reclaim tend to decrease the quality of your batch?

A. Welch. Until you extend the best synthetic or natural rubber it has no great serviceability for transportation purposes or other purposes it is used for. In connection with the extension of rubber with reclaim, some chemists extend rubber by the addition of reclaim that costs them 10¢ a pound or more and some extend rubber by adding clay or whiting which costs about a cent a pound. I take a rather dim view, however, of the manufacturer who will use a 1¢ a pound material instead of a 10¢ a pound material and then advertises that he uses no reclaimed rubber in his product. I am sure that no member of this panel has ever offered his company's product for the purpose of impairing the quality of any product in which it was to be used. No reclaimed rubber should ever be used except to produce the quality of product desired and at the lowest possible compounding cost.

There are products in which no reclaimed rubber should be used. There are products in which no carbon black should be used. A good compounder uses reclaimed rubber in his products in the quantity that will give him the best results. Reclaimed rubber is a specific compounding ingredient, not a diluent, and should be used to maintain and preserve quality and not to impair it.

Q. What are the latest methods for preparing or treating scrap rubber for reclaiming? Please cover tires, tubes, and miscellaneous scrap.

A. Busenberg. In the last few years the reclaimers have been attempting to effect economy first in the handling of scrap. If you assume that tires could be bought on a laid-down basis of \$25 a ton, that would be the cost of that raw material going into the grinding line, if it could be laid-down right there. I think that by virtue of cooperation between the reclaimers and the scrap dealers and other improvements all along the line, it has been possible to come a little nearer to scheduling incoming shipments of scrap direct to production. Of course, standby supplies of scrap must be kept for periods of bad weather when the handling and flow of scrap to the reclaimers are retarded, but it doesn't seem necessary to carry quite as much inventory of scrap as in the past, and there is money to be saved if it is not tied up in huge backlogs of emergency inventories of scrap.

Cranes with clamshell buckets have displaced to some extent the piling of scrap by hand. It is fairly common practice now to feed passenger-car tires directly into the grinding crackers. The rolls of the cracker are set so that the circular bead-wire construction is not too seriously dis-

rupted and most of the rubber is scuffed off the bead. The wire is picked up on the belt going from the cracker to the sizing screen. It may be returned to the mill for another pass or, by putting it on the down belt, it may be passed to an overhead belt or taken away by some other means, if it is fairly free from rubber.

The use of pallets and lift trucks and storing with reduced floor space charged against the operation might be mentioned as well as the experimental and actual production systems that use mechanical and air methods to separate and collect fibers. The obvious advantage of the new system of using mechanical and air methods to separate and collect fibers is that you have an extra product to sell. Also, by obtaining fiber-free rubber there is the possibility that the rubber might be reclaimed at a lower cost. In some instances, however, the rubber is not completely free from cotton and lint.

Q. Has the raw material used to make reclaim reached a point of uniform quality sufficiently high to produce quality reclaim? Are present methods of selection satisfactory to screen out undesirable scrap? What progress has been made to produce a reclaim of uniform characteristics consistently?

A. Nesbit. We of the industry feel we can make quality reclaims from any scrap rubber available in sufficient quantity. We can't make a pure gum reclaim out of an inferior scrap, but we can make a reclaim out of any scrap we can get in sufficient quantities.

Methods are available to segregate any undesirable scrap, but sometimes the labor cost involved in these methods is so high that certain scrap, such as mechanical goods scrap where you have a lot of contamination, becomes valueless.

It should be remembered that only a few short years ago we were called upon to make reclaim from synthetic rubber or combinations of synthetic and natural rubbers. It was thought by many at that time that we had a very difficult job ahead of us and that it was doubtful if we would succeed in making a good reclaim, but we have done a good job, I believe.

We have occasional complaints regarding lack of uniformity, but we used to have complaints when we used natural rubber scrap only. I think that today the reclaim we are making from the blends that we have to work with are surprisingly good. I might add that while we think we have done a good job because the total consumption in 1951 of reclaimed rubber in this country was a record 347,000 long tons, we are not resting on our laurels by any means. We realize that each of us competes against the other, and we also have to compete against natural rubber and synthetic rubber of various kinds, and if we can't do that, we will fail. This industry, which after all is almost as old as the process of vulcanization, doesn't intend to fail. We all maintain research laboratories which are constantly working to improve the quality of our product.

Q. Can rubber be reclaimed with steam alone? What pressure, temperature, and time interval are involved? Can natural rubber, synthetic rubber, and mixtures of the two be reclaimed this way?

A. Johnson. I think some types of scrap can probably be reclaimed with steam alone, but it is doubtful that the job can be done by any of the conventional methods and a satisfactory reclaim

obtained. The only experience I have had is with natural rubber carcass scrap, and the product was not satisfactory. However, if this question has to do with the method outlined in the Xylos popgun method of reclaiming, I am not qualified to discuss it. In my opinion, the use of steam alone is not a satisfactory method of reclaiming scrap rubber.

A. Shaffer. We have been able to reclaim natural rubber scrap by our high-pressure method where we use pressures up to 1,000 pounds and do a very satisfactory job. GR-S scrap cannot be reclaimed with high-pressure steam, however, and you cannot use scrap that contains fabric because the fabric is not removed by high-pressure steam alone.

Q. Are present rubber reclaims made from mixed GR-S and natural rubber scrap equal to alkali-process reclaims made from natural rubber scrap?

A. Johnson. Present-day reclaimed rubber has replaced alkali-process reclaim and apparently is doing a good job, based on Mr. Nesbit's statement on consumption in 1951, the majority of which I think was the newer type of reclaim.

A small amount of alkali reclaim still is being made, but this reclaim is probably not as good, based on our present methods of test. It is less tacky, has a lower elongation, and the rebound and flexing properties are somewhat reduced, but it may be just as satisfactory for some uses as the newer type of reclaim.

Certain compound changes were necessary to adjust the reclaim to present-day formulations to secure the proper cure, softness, and tack, but there were no changes necessary to get the value out of the reclaim.

Generally speaking, I would say that the present-day reclaims and the alkali process reclaims made from natural rubber scrap are about the same.

Q. What is the most practical way to grind scrap to pass through a 20 or finer mesh sieve?

A. Shaffer. The conventional smooth roll refiner used in connection with either a vibrating or rotating screen is a very satisfactory method for grinding scrap to 20- or 35-mesh fineness. There are several machines used for grinding rubber scrap, but when you try to grind finer than 35-mesh, the process is very slow and, in most cases, uneconomical.

Q. Our company buys practically all its reclaim from Midwest. Recently we were offered reclaim by a small manufacturer at a lower price than we are paying Midwest. Our tests on the samples submitted indicated that the material was of good quality. Can you supply any good reason why we should not buy the lower priced material?

A. Welch. I can think of situations in which I believe your company would be entirely justified in buying lower priced material. I like to believe, however, that our company and the other companies represented on this panel and many others who aren't represented here who have been in the reclaiming business a long time are not engaged in just converting a carload of scrap into a carload of reclaimed rubber. It isn't all we have for sale. We maintain research laboratories. Our laboratories are working day and night on abstract problems and how best to combine reclaimed rubber with the various grades of synthetic and natural rubber, studying their use with oil extended synthetic rubbers, etc. We make extensive and expensive microscopic studies with rubber compounds; we study raw materials.

When the mixed elastomer tire became

our source of supply of scrap and we started to make mixed elastomer reclaim to put back into tires, our company spent \$31,000 in tire test fleet work to determine how the mixed elastomer reclaim would work in tire compounds. I expect that some members of the panel spent more than that.

We experimented with mixed elastomer reclaim for a year, and when our salesmen went out to sell reclaim, they could say with good conscience that they were selling a commodity that wouldn't get the customer into trouble. Such development work is required for every reclaim made and sold by every reclaimer on this panel and some others. The cost of this work is, of course, included in the billing price of the reclaim.

Any company with a little bit of skill and a little reclaiming machinery can take some scrap and make a carload of reclaimed rubber, but they do this without the safeguard of any laboratory control or research work and the resultant study of the chemicals and oils used in the reclaiming process and the rejection of any bad materials. Under such conditions, these companies can undersell us, and I can't be too emphatic when I say that if we made our reclaim the same way, we could sell for a lower price.

I maintain that most of our customers buy their reclaim from established companies because they want the safeguard of the control and research work that goes into the products of these companies. If a customer wants to buy a carload of cheap reclaim that he won't know can be duplicated and if he feels safe in doing so, I certainly would be the last one to discourage him.

Q. What are the advantages and disadvantages of continuous and/or dipped process reclaiming? Include in this discussion present reclaiming processes and the possible future of these processes. How do the new high-temperature, short-cycle reclaims compare with the standard types in physical properties imparted to the final compound? Is there a new way to make reclaim? What is the latest and most efficient method? What are the relative merits and economies of the Banbury and dip-process methods of reclaiming, and how do these compare with the standard processes? Please explain the difference between the Lancaster system of Farrel-Birmingham and the screw system of U. S. Rubber Reclaiming?

A. Nesbit. U. S. Rubber Reclaiming makes two kinds of reclaim: two-thirds of it is of the conventional variety, and the other third is known as the dip type. The dip or continuous process of making reclaimed rubber possesses certain advantages from a production and economy standpoint. We think the dip process, for certain jobs, produces a better reclaim. From the time the scrap tire is placed on the belt which conveys it to the cracker until it is a finished reclaim requires just about one hour's time. We can process either natural or synthetic rubber or any blend of the two with equal success. We use fabric-free scrap and so must separate the rubber from the fabric by a mechanical process.

I am not competent to compare our dip process, however, with the so-called Banbury process since I am not too familiar with the latter. The dip process, being a continuous one, I think possesses certain advantages over the Banbury method, which, I understand, is a batch process.

The dip process is not a high-tempera-

ture process. The temperatures at which the material is processed are lower than the temperatures used in the digesters of the modern type. We obtain the fast devulcanization by chemical agents and by utilization of the discovery that maximum softening of scrap rubber occurs in a very few minutes.

There are plenty of new ways of making reclaimed rubber. Every reclaimer is trying the new methods and processes, and we feel that our dip process is a distinctly new method. We avoid the costly and slow devulcanization and drying of the older processes, with the consequent saving of storage time and space. During the one hour of processing the scrap is continuously in motion. Fine grinding and fabric-free scrap are used to insure uniform reclamation of today's mixed elastomer scrap. Continuous processing by a screw-type machine seems more efficient to us than batch-type processing.

With regard to the relative merits and economies of the Banbury and the dip process and their comparison with the standard processes of reclaiming, I have answered part of this question, but I am not too familiar with the Banbury process. I have heard that the Banbury process can be usefully employed for factory scrap where the scrap is immediately available and can be processed in the same place that it is produced. I have never seen or heard of a whole tire reclaim made by the Banbury process being offered for sale; so I can't say how it would compare with other processes quality-wise.

Q. What effect has the long continuous screw-type machine had in short cutting processing and improving efficiency and the quality of the resultant reclaim? Can straining and rough refining be combined in the single screw-type machine?

A. Johnson. The new method of processing which we have started to develop in our plant employs the Mil-Strainer of National Rubber Machinery Co. and eliminates some of the conventional reclaiming machinery. The process is semi-automatic and improves quality, efficiency, and uniformity. The development is in its infancy, however, and I can't tell you too much about the matter of straining and rough refining in a single screw-type machine because we haven't gone that far yet, but I think it can be done.

Q. What is the best method for reclaiming mixtures of natural and synthetic rubber scrap? What are the best types of accelerators for blends of reclaim and GR-S to be used in molded items?

A. Busenberg. I would like first to talk about tires and the treads that are skived from tires which represent the big volume of scrap material used by the reclaim industry and is a mixture of GR-S and natural rubber. Early in the GR-S program the government asked the reclaiming industry whether they were going to be able to handle such a mixture in existing equipment. A program of development work was carried out, and everyone answered the question in the affirmative.

Reclaiming a mixture of GR-S and natural rubber doesn't seem to be as much a process or method of heat application or method of reclaiming as it is a compromise by the reclaim technician between cooking and reclaiming agents. It is a matter of formulation rather than equipment. Softener and reclaiming agents must be used with which both GR-S and natural rubber are brought to somewhat near the same plasticized con-

dition. The expensive part of making reclaim is the processing of a thin-gage film on the refiners. The refining operation is a homogenizing one, and the more nearly these various heterogeneous particles are converted to the same condition in the preparatory step, the better the refining characteristics and the cheaper the reclaim will be.

The neutral digester process is a very satisfactory process for reclaiming whole passenger-car tires made of GR-S and natural rubber. The fiber can be separated mechanically, and there are a number of alternate methods that could be used for reclaiming the rubber or mixtures of rubbers. The continuous method, the Banbury method, or the heater process could all be used. In reclaiming the treads, I would recommend fine grinding followed by the use of the heater method. The tread rubber or any other fiber-free rubber can be reclaimed by the heater, continuous, or Banbury methods.

Much of the factory scrap coming from all the mechanical goods departments contains nitrile rubbers, neoprene, and various kinds of vulcanizates that have been concocted to make heat resistant compounds that will stand up under very severe service. To take such a mixture and arrive at a common formulation that will blend together homogeneously is quite a chore. Tires can be bought for 1½¢ a pound and reclaimed easily by mass production methods, and it is probably more economical to reclaim tires than it is to reclaim the heterogeneous mixtures even though you get the latter free.

Under the conditions where it is advisable or where it is economical to reclaim a difficult mixture, the Banbury method has the best chance of success. This method fine grinds and masticates and helps to a considerable degree to homogenize such a mixture.

Accelerators for blends of reclaim and GR-S to be used in molded items include a thiazole-type plus some small amounts of kicker. I prefer 1-2% of MBTS and 0.10-0.35% of a thiuram accelerator on the rubber hydrocarbon. In some instances if a dead stock is being used along with the reclaim, the stock may be a little scorchy, and a retarder of the salicylic acid type is useful. If speed of vulcanization is essential, the higher of the two accelerator ratios plus a retarder might be advisable. For curing straight reclaim I would recommend Captax and DPG. You can also use thiazoles with metallic dithiocarbamates, such as Zimates, the aldehyde amines, and other amines. Some of these give very flat, plateau-like curing curves and cure to a very similar degree over a long range of temperatures.

Q. Suggest the best method of Banbury mixing of soft reclaim stocks and small amounts of GR-S, other than masterbatching.

A. Shaffer. The Banbury mixing of soft reclaim and a small amount of GR-S could be improved by having the reclaimer blend the GR-S with the reclaim in the refining process, or by using pelletized GR-S, or the GR-S could be mill mixed before compounding the reclaim.

Q. Does reclaim have equal utility in a period when GR-S is the chief rubber used, as compared to a period when natural rubber is the most widely used rubber? What would be the future of the reclaim industry if GR-S sold between 15 and 17¢ a pound?

A. Welch. To answer the second half of the question first, I am sure, although I haven't consulted any other member of the panel, that every one of them and

everyone else who is in the rubber reclaiming industry realizes that so far as we can see in the future, our competitive rubber hydrocarbons will be synthetic rubber. Natural rubber will be an auxiliary rubber and in my opinion will not reassert itself as a principal rubber. While I think there will always be some natural rubber used, and I sincerely hope so, the controlling factor will be the synthetic rubber used. We in the reclaiming industry, therefore, have to face the question of what the competitive price will be, and we would be less than diligent if we did not ask ourselves what would happen if synthetic rubber sells for 17¢, 15¢, or 20¢ a pound, and try to come up with the right answer, because the wrong answer might put our stockholders' money in jeopardy.

You have heard here today of the work being done by U. S. Rubber Reclaiming with what is called the dip process. You have heard of the work of the Goodyear Tire & Rubber Co. with screw mixers, and I know Xylos and other companies are not lagging in their development work. Our company is spending a million and a half dollars without obtaining any particular expansion of our capacity or modernization. We would not be doing this if we thought we were going out of business, or if we had not investigated the probable competitive price of synthetic rubber. I tell you with the utmost conviction that I do not expect to see synthetic rubber sell at 17¢ a pound. Synthetic rubber produced by private industry will have a different cost than that produced by the present government subsidized industry. Butadiene costs 21¢ a pound, and so does styrene, but the government uses 10¢ a pound butadiene and styrene in making GR-S. The GR-S plants are free of many taxes which would apply to private industry, and their management doesn't make contributions to community funds and other things that private industry is asked to do. I have made inquiries, and I have been advised by people whose opinion I value that in private hands the cost of GR-S, with no alcohol butadiene used, would be about 31¢ a pound. As oil is used as an extender, the price might be brought down to 25¢ a pound.

Reclaimed rubber has greater utility in periods of high GR-S use because of the stabilizing effect of synthetic rubber on the price of all rubber. I have seen the price of natural rubber vary from \$1.21 a pound to 2¾¢ a pound, which must have made for an excessive number of changes in the rubber/reclaim ratio in rubber compounds. With the rubber goods industry's economy geared to a raw material of more stable price, and natural rubber price directly related to the price of synthetic rubber, reclaimed rubber can be used to take full advantage of its economic value and need not be varied continually because of large variations in the price of the base rubber. For these reasons I believe reclaimed rubber will have greater utility in periods of high GR-S use.

Q. Is reclaimed rubber used in greater amounts with cold (LTP) GR-S or regular GR-S?

A. Shaffer. The tire compounders I have contacted all seem to agree that there was no difference in the amount of reclaim used with cold or regular GR-S.

Q. What oils are used in reclaiming elastomers of the type of Pliolite S-6? Why is this oil best for this use? What other conditions must be observed in reclaiming this-type material?

A. Johnson. Pliolite S-6 is a styrene-

butadiene copolymer and is used largely as an organic reinforcer for rubber compounds. It is thermoplastic and may be prepared for reuse by milling on a two-roll mill. Any cured scrap containing Pliolite S-6 as a compounding ingredient may be reclaimed by the conventional methods.

Q. Can neoprene be reclaimed? Are there any special compounding problems?

A. Shaffer. Neoprene scrap has been processed and sold for many years. The finished reclaim has a much higher acetone extract (35%) than is present in ordinary reclaimed rubber, owing to the greater amount of plasticizers used in reclaiming neoprene scrap. The principal objection to the high acetone extract in a neoprene reclaim is that it reduces the amount of neoprene polymer in the reclaim.

Neoprene reclaim imparts lower modulus and higher elongation in new neoprene compounds. There is, however, only a slight loss in oil-resistance properties.

Q. Has there been any attempt to reclaim nitrile rubber commercially? If so what would be its advantages as a compounding ingredient in nitrile rubber stocks?

A. Shaffer. Nitrile rubber mechanical goods scrap was reclaimed as early as 1942. Nitrile rubber scrap is difficult to grind and usually requires four refining passes with an aging period between the second and third passes to promote the penetration of the plasticizer.

In general, nitrile rubber reclaims follow the same pattern as the neoprene reclaims in that considerable quantities of oils are required, and the resulting reclaims have lower than usual elastomer contents. Their high oil content makes it undesirable to use them where exposure to solvents might leach out the added plasticizer and cause excessive shrinkage of the product in which they are used.

Q. Has anyone analyzed a reclaiming oil and tested the components to determine what are the active ingredients of a reclaiming oil, what makes them work, and which are the best?

A. Shaffer. Coal-tar fractions, naval store chemicals, and certain unsaturated fractions from petroleum are generally used for reclaiming. Each reclaimer has his own favorite types of materials for each type of reclaiming job. The conditions of time, temperature, type of scrap, and the mechanical treatment are so varied that it is practically impossible to make generalizations.

One of the reasons for the lack of a proven explanation of the action of reclaiming oils is the fact that very little data can be obtained on chemical reactions which take place in a solid. We do know, however, that oils which swell and soften rubber particles have a better chance of being useful in reclaiming.

No one oil is best for all purposes. Each type of scrap rubber has been found to require different methods of reclaiming including the use of different types of oils. The end-use of the reclaim also is a factor in determining the type of treatment and oil which should be used.

Q. What effect will the oil extended GR-S ultimately have on the reclaim industry? Will the present scrap rubber which includes oil extended GR-S produce inferior or equally good reclaimed rubber?

A. Johnson. Oil extended GR-S will undoubtedly have some effect on the industry, largely because of cost. It is too early to make any definite statement, since development work on this type of GR-S has not been completed. So far as

I know, only the GR-S with 25 parts of oil is more or less accepted commercially, but work using more oil is in progress.

The reclamation of oil extended GR-S is just another problem to be solved. Development work on reclaiming this type of scrap has been planned, but we have not started any actual work as yet. We feel that this-type scrap can be processed satisfactorily and that we can prepare reclaims equal to or better than those of the present day, if the quality of the products which use oil extended GR-S is not adversely affected. Past experience with other scrap of varying quality would indicate that the reclaim made from these products should not suffer in quality.

Q. What are the specifications for a good reclaim oil? Does petroleum, coal, or pine oil give the best results? What can the petroleum industry do better to promote the use of petroleum reclaiming oils? What quantities of oil give the best results when used in reclaiming?

A. Johnson. So far as I know there are no standard specifications for a good reclaiming oil. In general, however, it should have reasonably high flash and boiling points, should be non-toxic, and should be of a viscosity that will permit pumping during zero weather. It should possess good penetrating and softening powers on rubber when used in reasonable amounts and should be able to function at the temperature of 300-500 pounds of steam.

All three types of oil give good results during devulcanization. We prefer the coal-tar type; others prefer petroleum or pine oil. There are also many variations with each of these three types of oil, all of which are not always satisfactory. Reclaim process variations from plant to plant also have their effect on the effectiveness of a given oil.

The petroleum industry knows what it has available and can submit samples for trial. In the past a great many oils submitted for trial were by-products with little or no value as reclaiming oils, although some were acceptable. With all the changes in rubber, GR-S, types of carbon black and pigments being made today, I think it is eventually going to be necessary to have compounded oils or blends of oils to reclaim the scrap returned for devulcanization.

The quantity of oil required for best results will vary with the type of reclaim desired and will vary from 5% to 20%.

Q. How can the chemical industry assist reclaimers in improving their products and price?

A. Welch. That part of the chemical industry which supplies the reclaiming industry with the oils and other chemicals which we use can help a great deal by becoming more familiar with the problems of the reclaiming industry and the way the chemical industry's products are used in it. By this I mean visiting our research laboratories and finding out for themselves what properties we are looking for in reclaiming oils and other chemicals and what we are trying to do to make reclaims of proper plasticity and aging characteristics, etc. Also, reclaimers are always looking for oils with maximum ability to penetrate and soften vulcanized rubber so that the amount of oil used can be reduced and the finished reclaim have a higher hydrocarbon content and a lower acetone extract. I think the chemical industry could do a lot more to help the reclaiming industry along these lines.

With regard to chemicals used with

finished reclaim and the use of reclaim in finished rubber products, the chemical industry is doing much good work in the introduction of chemicals compatible with reclaim and other elastomers used in rubber goods manufacture. I think the discussion by the panel up to this point should convince rubber goods manufacturers that in reclaim they are obtaining an awful lot for their money at the present time.

Q. What so-called chemical peptizers are used most in modern reclaiming, and what are their advantages and disadvantages?

A. Shaffer. Certain peptizers, such as Silax, RR-10, Agent K, and the RPA's, are being offered to the trade today as chemical peptizers. Their advantages include the lower amounts of oil required and the resultant high hydrocarbon content of the reclaim made together with the more rapid devulcanizing action obtained with the chemical peptizers. Disadvantages include the very strict control necessary of the quantities of peptizers used and the fact that only a limited amount of these chemicals can be used in reclaiming mixed scrap. Too much peptizer used with mixed scrap may result in too much devulcanization of some portions of it.

Q. If calcium chloride is being used instead of sodium chloride in reclaiming, is this something new? What types of scrap rubber are reclaimed with calcium chloride, sodium hydroxide, and zinc chloride? Does the end-use of a reclaim dictate how it is made? Can calcium chloride replace zinc chloride completely? How is calcium chloride used? What is done with carbon dioxide given off during reclaiming; does it have to be vented?

A. Busenberg. Calcium chloride, sodium hydroxide, and zinc chloride are all used to aid in the destruction of the fiber in scrap rubber. The neutral digester process we have been referring to uses metallic chlorides as defibering aids. The alkali process, of course, uses sodium hydroxide.

Since the advent of GR-S as a major part of scrap rubber, the trend has been away from the alkali process and toward the neutral process for making reclaimed rubber. When the scrap rubber was all natural, 75% of the digester reclaim was made by the alkali process. The other 25% was special-purpose reclaim, made with metallic chlorides and with zinc chloride the most common metallic chloride used. Only a small percentage of metallic chloride is required; the percentage depends on the steam pressure at which the digester operates. The proportion of alkali versus neutral-process reclaim has now been reversed, and the special-purpose reclaims are now made by the alkali process.

The alkali-process reclaim has superior characteristics for certain uses, such as better solubility in organic solvents, which makes it more desirable for the manufacture of cements and adhesives. Some people prefer alkali-process reclaim because of its more rapid curing rate and its accelerating effect on cure when used in certain types of compounds. The tire compounders, however, have largely switched from alkali to neutral-process reclaims. I think the neutral-process reclaims will continue to be used in greatest volume.

Because of the critical nature of the supply of zinc metal, there has been a trend toward the use of calcium chloride. Several other metallic chlorides can be used, but the economics favor the use of calcium chloride.

Carbon dioxide is generated in the diges-

ter in the neutral process, and if the pressure exceeds that allowable for the vessel, the carbon dioxide must be vented to the atmosphere.

Q. Which produces the best grade of reclaim, the alkali or neutral process? Which process is the cheaper of the two, and which process has the best future?

A. Busenberg. The question whether alkali or neutral-process reclaim is better is quite controversial. The alkali-process reclaim was considered best for natural rubber tire carcasses when it was made from natural rubber scrap and showed a higher curing rate than the neutral reclaim. For other end-product uses, the neutral-process reclaim was and still is considered the better of the two.

Neutral-process reclaim has lower water absorption, is smoother and less nerry, and has less shrinkage and lower swell than alkali-process reclaim. Resistance to weathering is also better with the neutral-process reclaim.

I think the tire compounders, who are now using neutral-process reclaims, will not return to the use of alkali-process reclaims because of the fact that the former are less nerry and scorchy, and the compounder can supply additional acceleration for cure, if necessary. The compounder is no longer presented with the problem of variable alkalinity in his reclaim if he uses those made by the neutral-process, and I believe that this process is more adaptable to the present-day scrap rubber, and good grades of reclaim can be produced more cheaply by this process. I think, therefore, that the neutral process has greater possibilities for the future than the alkali process.

Q. What is the lowest-cost reclaiming method? When will the 6¢ a pound all tire reclaim with 50% rubber hydrocarbon be available?

A. Welch. The lowest-cost reclaiming process is whatever process takes vulcanized rubber and converts it into a condition where it can be revulcanized. You have heard today of the dip process, the Banbury process, the Firestone gun high-pressure method, and the pan process. Most reclaim is still made by the digester process. All these processes are essentially the application of heat and chemicals to a degree necessary to make the scrap rubber plastic enough so that it can be reintroduced into a rubber compound. The best method may not be the cheapest method. Each of these processes has its advantages and disadvantages, and all are constantly being changed.

With regard to the time when whole tire reclaim will sell for 6¢ a pound, if I knew the answer to that question I would be the only person in the world who knew what the purchasing power of the dollar will be in the future, and that would be a secret I wouldn't share with anyone. I will promise you this, however, Midwest Rubber Reclaiming Co. will sell reclaim for 6¢ a pound the first day you can buy a drink of whiskey for a dime, a sirloin steak dinner for 75¢, and the first time you can again get into an Akron Rubber Group meeting for \$1 instead of \$4, as it is now.

Q. What are the present uses for reclaimed rubber dispersions? How can you make a non-staining reclaim?

A. Busenberg. One use of reclaimed rubber dispersions of the casein type is for the saturation of tire cord. Other dispersions are used to produce rubber backing on rugs and carpets, and others are used as automobile adhesives to stick felt or other sound-deadening material on

cardboard. There are many other uses, but these are the ones I happen to know about.

The term non-staining is relative. The methods used to obtain non-staining reclaims would vary, depending on the severity of the requirement; whether it is to prevent contact staining of enamel under rubber gaskets, or whether to prevent antioxidant bleeding and migrating from the piece of rubber. You also have the problem of migration of material from one compound into another as from a carcass into a white sidewall of a tire.

Naturally the reclaimer, if it were possible, would try to select scrap having a minimum of staining ingredients in it. There are oils available to the reclaimer which are relatively non-staining, and he can use those oils and make a reclaim which is suitable for the majority of purposes. Where the requirements are extremely severe, the use of activated carbon somewhere in the reclaiming process does help to adsorb and tie up the staining materials so tenaciously that they don't bleed out and cause trouble. The whole thing is relative so that it is practically impossible to obtain an absolutely non-staining reclaim. We have been able, however, to match the properties of a non-staining natural rubber compound fairly well.

Q. Is reclaim in its infancy, or is it now an adult? Is it likely that new processes will be discovered that will open new fields for reclaim?

A. Welch. Reclaiming of scrap rubber definitely is an adult. The first patents on the reclaiming process were granted to Charles Goodyear. The reclaiming industry is much more than twice as old as the tire industry, three or four times as old as most other branches of the rubber industry.

I think you have heard enough here today to realize that new processes are constantly being discovered and will continue to be discovered.

Q. In February, 1948, Mr. Welch, you appeared before the United States Senate subcommittee in opposition to HR 5314, a bill introduced by Mr. Shafer to strengthen the national security by providing for the maintenance of an adequate rubber producing industry. At that time you predicted dire consequences if this bill became a law. Your company seems to have done pretty well since 1948. How do you account for this situation?

A. Welch. One way I would account for the situation is that Shafer's bill did not become a law. I said in opposition to the bill, which would have given us a five-year rubber program with the most rigid controls exercised from Washington, that the rubber reclaiming industry asked no favors in Washington, just a chance to stand on its own feet, to sell its product competitively, without subsidies, required use, and without borrowed money from the government. While we were willing to do this, I said I did not want to be regimented any more than necessary, and the less the better. I said at that time if Congress made the monumental error of turning the rubber industry over to an administrative bureau of the Federal Government, we would have to learn to do reverence to a new type of rubber hero in the future. He would be neither an engineer nor a chemist; he would be an administrative lobbyist. His headquarters would not be a laboratory, but a Washington hotel. His duties would not be to produce better and safer tires at a lower price, but rather to be able to get

some administrative rule of the rubber bureau changed or interrupted for the benefit of the company which employed him. The cocktail glass of Washington would replace the beaker and the Bunsen burner of the laboratory. Industrial progress, gentlemen, does not lie in that direction.

I don't take any credit for the fact that Mr. Shafer's bill didn't become a law. A much less objectionable law was passed. I did not publicly oppose it, although privately I was opposed to it. I feel the same way now that I did in 1948; I don't like government regulations, and I don't like bureaucratic control of the rubber industry.

Q. What complications arise in the reclaiming of rubber due to the use of man-made fibers such as nylon, Orlon, glass, etc., in rubber products?

A. Johnson. I have never had to reclaim any scrap containing glass fiber, but the other fibers present no unusual difficulties.

Q. What's the most effective and economical means of reclaiming silicone elastomers?

A. Shaffer. I don't think the reclaiming industry has had any experience with silicone elastomers because the amount of silicone scrap is very limited. No work has been done so far as I know with that particular type of scrap.

Q. What percentage of total reclaim is black, and of this what percentage is of the non-staining type?

A. Nesbit. About 90% of the reclaim made is black, and of this 90% possibly 10% is of the non-staining variety.

Q. What particular uses of black reclaim require the non-staining type?

A. Nesbit. Non-staining black reclaim is required for hard rubber steering wheels, white sidewalls for tires, and in items in refrigerators and on automobiles where non-staining compounds must be used.

Q. Which is the material more responsible for the staining effects of reclaim, the oils used or the antioxidants?

A. Busenberg. I think the oils are the major cause of staining from reclaims. Many of the antioxidants are non-staining, and if the reclaimer does not use scrap from compounds compounded for heat resistance with large amounts of antioxidants, he should not have too much staining difficulty from antioxidant content.

Goodyear Medal Nominations

J. H. FIELDING, of Armstrong Rubber Co., and chairman of the Goodyear Medal Award Committee of the Division of Rubber Chemistry, American Chemical Society, has asked that names of candidates for this award be sent by Division members to C. R. Haynes, Binney & Smith Co., Division secretary, 41 E. 42nd St., New York, N. Y. on or before April 10.

Candidates' names should be accompanied by a memorandum giving in some detail what a candidate has accomplished in the way of aiding and advancing rubber chemistry and technology.

Consideration of the various candidates will be given at the time of the spring meeting of the Division in Cincinnati, O., April 30 through May 2, by the executive committee of the Division.

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STATEX-M



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Tlargo Silver Jubilee

THE Los Angeles Rubber Group, Inc., began the celebration of its twenty-fifth anniversary at its first meeting of the year on February 5 at the Mayfair Hotel, Los Angeles, Calif. The meeting, attended by more than 250 members and guests, was sponsored by the past chairmen of the Group, and arrangements were handled by a committee headed by R. B. Stringfield, of Fullerton Mfg. Co., organizer and first chairman of the Group.

The afternoon technical session, under the direction of Neil Pestal, Firestone Tire & Rubber Co., featured a talk on "Polygen—A New Class of Synthetic Rubbers" by Edward V. Osberg, General Tire & Rubber Co. Mr. Osberg stated that oil-enriched rubber is only the first in a new group of synthetic rubbers based on the Polygen development. The Polygen system holds unlimited possibilities for the future since the product can be varied over a wide range by using different types of tough rubbers and plasticizing additives. Some of the new developments arising from Polygen include rubbers that perform successfully at Arctic temperatures, and laboratory indications that oil-enriched rubbers can replace natural rubber in both auto and truck tires. Introduced commercially last year, oil-enriched rubber has already resulted in a \$50,000,000 per year industry based on present output, Mr. Osberg said.

The evening dinner session highlighted a talk on "Free Enterprise" by Fred D. Fagg, Jr., president of the University of Southern California. In his talk Dr. Fagg stressed the need of training the youth of today to develop character and live in harmony with his fellow men.

A. L. Pickard, Braun Corp., reported on the status of the educational fund for the Tlargo Foundation at USC. Gifts of \$53,085 by 37 manufacturers and individuals have been made to date toward the Foundation's minimum goal of \$100,000. One of the nation's most valuable and extensive privately owned libraries on rubber has been donated to the Foundation by David Spence, rubber consultant of Pacific Grove, Calif. The "David Spence Rubber Technology Library" will be an important part of the Foundation, and Dr. Spence also contributed \$5,000 toward its upkeep. Built up from English, French, Dutch, and German sources, the collection will be housed in the Doheny Memorial Library building at USC.

The meeting closed with a drawing for six door prizes contributed by the past chairmen. Prize winners were W. O. Newstrom, International Paper Co.; Charles Nordine, Byron Jackson Co.; Jack Ross, R. L. Mitchell Rubber Co.; Tom Abbate, Zellerbach Paper Co.; Dan Budnick, Sierra Rubber Products Co.; and Howard Keefer, California Rubber Products Co.

Trio Discusses Butyl

THREE talks on "Butyl—Its History, Manufacture, and Applications" featured the January 16 meeting of the Washington Rubber Group, held in the auditorium of the Potomac Electric Power Co. Bldg., Washington, D. C. Approximately 120 members and guests heard the talks by W. J. Sparks and R. M. Thomas, both of Standard Oil Development Co., and A. N. Iknayan, United States Rubber Co. Prior to the meeting an informal dinner for friends of the

speakers was held at O'Donnell's Restaurant.

Dr. Sparks reviewed early work on isobutylene polymerization, starting with the first preparation of dimers in 1876 and early developments leading to the commercialization of polymers in aviation gasoline and lubricating oils. These events, along with the work of Otto in Germany, and later of Otto and Thomas in the laboratories of Standard Oil Development Co., resulted in the successful commercial preparation of high molecular weight polyisobutylene. Dr. Sparks also considered some of the problems encountered in developing commercial production methods for butyl and in teaching the rubber industry how to use it.

Mr. Thomas dealt with the manufacture of butyl as seen by a tour through the Baton Rouge RFC plant, using slides to illustrate his talk. Material presented included the origin and handling of the raw materials, a description of the process, the process control variables, the grades of polymers produced on a commercial scale, and the possibilities for the production of experimental-type polymers in the future.

Dr. Iknayan's talk covered the growth in usage of butyl in commercial applications because of its outstanding heat and age resistance, and its greatly improved air retention properties over previously known tire tube materials.

Vodra on "White Carbon Black"

A talk on "White Carbon Black—A Practical Anomaly," by Victor H. Vodra, Wyandotte Chemicals Corp., highlighted the February 20 meeting of the Washington Rubber Group, held in the Pepco Auditorium with about 75 members and guests attending.

Mr. Vodra stated that ultra-fine particle-size calcium carbonates actually reinforce synthetic rubbers and, therefore, can be used in higher, extender-type loadings to reduce compound costs. The dry powdered carbonates impart tack to GR-S compounds. Heating the stocks removes the tack, but cooling the stocks makes them sticky and adaptable to processing without natural rubber. Compounds can be made containing twice as much carbonate as rubber, the speaker declared. Use of carbonates improves the tensile strength, flex cracking, and tear resistance of rubber. Good dispersion is necessary with the carbonates, and some modification of processing technique is also required. Instead of adding the ingredients one by one, all are poured into the Banbury without previous mixing. By means of this method, mixing time is appreciably reduced.

Plant Safety

THE February 8 dinner-meeting of the Chicago Rubber Group was on the subject of plant safety. Some 200 members and guests were present at the session held in the Morrison Hotel, Chicago, Ill., and heard two speakers. H. T. Walworth, Lumberman's Mutual Casualty Co., discussed "Hazard Control in the Rubber Industry," and Arthur B. Guise, Ansul Chemical Co., spoke on "Some Notes on Fire Protection in the Rubber Factory."

Mr. Walworth described the problems connected with control of hazards in the rubber industry, and the functions of insurance company representatives in help-

ing manufacturers eliminate such hazards. The rubber industry has a good record insofar as hazards are concerned. While certain chemicals have been found to cause dermatitis or other illnesses, it is usually possible to replace these chemicals with non-hazardous types. The principal sources of hazards in the rubber industry as well as in other industries were given by the speaker, as follows: handling of materials; working with machinery; stepping on objects; being struck by objects; and miscellaneous hazards, such as skin irritations and falls. While skin irritations occur in the rubber industry with about twice the frequency as in other industries, other accidents are in the same proportion as for other industries. Mr. Walworth also discussed the solvents used in the rubber industry, and the principles of proper ventilation to eliminate danger.

Mr. Guise described the principles behind the use of fire extinguishers for materials commonly used in the rubber industry. Water is the best extinguisher for rubber itself, and a sprinkler system is necessary where rubber is stored. Water may also be used for thick cements, but a smothering agent is preferred for thin cements and solvents. The speaker also stressed the need of a planned program of maintenance for plant fire extinguishers. Some of the unusual sources of fire in the rubber industry are static electricity on calendars and other machines, and the different electrical equipment used in a plant.

A color film, "Know Your Extinguisher," was also shown through the courtesy of the Associated Fire Mutual Insurance Cos. Preceding the meeting there was a series of special exhibits on materials handling and plant safety equipment for the rubber industry. Lift and other trucks were shown by Barrett-Cravens Co. and Towmotor Corp. Alvey-Ferguson Co. displayed its coordinated conveying systems, including flow controllers and conveyor cleaners. Various types of fire extinguishers were exhibited by Ansul Chemical, while West Disinfecting Co. showed its hand cleaners and disinfecting service for industrial use.

At a meeting of the Group's executive committee in November, 1951, it was unanimously decided to incorporate under the laws of the State of Illinois. Incorporation papers were filed and a certificate granted, effective January 11, 1952. Group officers, directors, and committees remain unchanged until the end of the fiscal year (May, 1952).

High Polymer Physics

THE Division of High Polymer Physics, American Physical Society, will hold its tenth meeting on March 20-22 at Columbus, O., in conjunction with the meeting of the Society. Two symposia and three sessions of contributed papers have been arranged by the Division's program committee, headed by Rolf Buchdahl, Monsanto Chemical Co.

Maurice L. Huggins, Eastman Kodak Co., has been elected chairman of the Division for 1952, and Raymond F. Boyer, Dow Chemical Co., has been elected vice chairman. W. J. Lyons, Firestone Tire & Rubber Co., was reelected secretary-treasurer. Lawrence A. Wood, National Bureau of Standards, has been elected to a three-year term on the Division's executive committee.

Neoprene Coating

WHILE neoprene is familiar as an interior lining for chemical process equipment, most corrosion engineers are not yet aware that it is now produced in a form which makes it eligible for maintenance work on the exteriors of tanks, process equipment, structural steel, pipelines, and the like. This point was made in a talk on "Neoprene Maintenance Coating" given by L. S. Bake, E. I. du Pont de Nemours & Co., Inc., before a meeting of the St. Louis Section, National Association of Corrosion Engineers, on January 21 at the Forrest Park Hotel, St. Louis, Mo.

Unlike the older linings, the new material is not intended for direct immersion in corrosive chemicals, but for protection against splash, spill, and corrosive fumes and atmospheres. Neoprene maintenance coatings are the result of two developments: (1) a slightly modified polymer which, before vulcanization, produces solvent solutions of low viscosity per unit of solids content; and (2) accelerators which will cure this polymer at room temperature. The main ingredients of the coating are the neoprene, and aromatic solvent, carbon black, and a separately added accelerator. The coating dries by solvent evaporation and cures by polymerization of the neoprene.

The finished film possesses the chemical resistance of neoprene, is tough and rubbery, and has inherent resiliency. The coating brushes readily despite the solids content of 60-70%, and, after addition of the accelerator, cures ready for service in 24-48 hours at room temperature. A second coat may be applied two to three hours after the first coat, and a fresh coat also bonds well to a fully cured prior coat. Shelf life of the coating is at least a year, but only 12-36 hours after addition of the accelerator. For good adhesion the surface must be thoroughly wire brushed or sandblasted, and a coat of primer (chlorinated rubber) applied. Coating colors other than black can be had only at the expense of some chemical and abrasion resistance, and light pastel colors are impractical.

Cadwell Detroit Speaker

A TALK on "Gum Plastics" by Sidney M. Cadwell, United States Rubber Co., highlighted the February 15 dinner-meeting of Detroit Rubber & Plastics Group, Inc., at the Detroit-Leland Hotel, Detroit, Mich., with some 150 members and guests attending.

Dr. Cadwell described the gum plastics as a new family of tough, versatile materials made by combining the right synthetic rubber with the right synthetic plastic in the right way. By offering a wide range of properties not completely shared by either hard or soft rubbers, or by conventional plastics, these materials open new fields of application and make it possible for the rubber industry to perform many new jobs and many old jobs in a better way. Unreinforced gum plastics combine high impact strength with dimensional stability; have a wide hardness range from flexible to stiff; can be drawn, molded, or extruded; and give parts which can be drilled, sawed, threaded, and machined.

In the business session preceding the talk, Group Chairman G. P. Hollingsworth, Minnesota Mining & Mfg. Co., announced that the vacancy in the office

of vice chairman would be filled by Treasurer E. V. Hindle, of U. S. Rubber. H. W. Hoerauf, also of U. S. Rubber and membership committee chairman, takes over as treasurer for 1952; while Boyd Holms, Ford Motor Co., will be the new membership chairman.

Rubber for Army Uses

A TALK on "Army Needs for Rubber-Like Materials," by Warren G. Stubblebine, Office of the Quartermaster General, featured the January 25 dinner-meeting of the Philadelphia Rubber Group, held at the Poor Richard Club, Philadelphia, Pa., with 153 members and guests in attendance.

Dr. Stubblebine gave a progress report on the development of rubber articles for Army use where service requirements include resistance to extreme conditions of temperature, such as -90° F. in arctic regions and $+160^{\circ}$ F. in certain storage conditions. Rubber products discussed included tires, tubes, seals and gaskets, coated fabrics, insulations, tape, hose, and belting.

New Group officers for the coming year were announced, as follows: chairman, Thomas W. Elkin, Armstrong Cork Co.; vice chairman, George J. Wyrrough, R. E. Carroll, Inc.; and secretary-treasurer, Anthony DiMaggio, Firestone Tire & Rubber Co. Other directors, in addition to the officers, are: one year—Herbert J. Reid, L. H. Gilmer Division, United States Rubber Co., Clyde H. Boys, Hercules Powder Co., and James B. Johnson, Linear, Inc.; two years—Russell A. Kurtz, E. I. du Pont de Nemours & Co., Inc., and Doran E. Sausser, B. F. Goodrich Chemical Co.; and three years—Leo J. Dete, Carlisle Tire & Rubber Co., and Ralph M. Harper, Philadelphia Naval Base Station.

Officers Elected

NEW officers for 1952 of the Northern California Rubber Group were announced at the annual Christmas party, held December 14 at Planters' Dock, Berkeley. The party was attended by approximately 120 members and guests, who enjoyed a dinner, evening of dancing, and the distribution of many door prizes.

The new officers are: chairman, Neil McIntyre, Oliver Tire & Rubber Co.; vice chairman, Jos. W. Hollister, Mare Island Navy Yard; secretary, James A. Sanford, American Rubber Mfg. Co.; treasurer, William H. Deis, Mare Island; and directors, in addition to the officers, Halsey C. Burke, Burke Rubber Co., Leonard Hohl, American Rubber, Wm. M. Moser, Kirkhill Rubber Co., and Jack B. Watson, Goodyear Rubber Co.

The Group's first regular dinner-meeting of the year was held February 7 at the Berkeley Elks Club, with some 48 members and guests attending. Speaker of the evening was E. V. Osberg, General Tire & Rubber Co., who discussed Polygen rubbers. Using slides to illustrate his talk, Mr. Osberg discussed the properties of these rubbers, their applications, and their economic implications. A brief talk on the relation of the A. C. S. Division of Rubber Chemistry and its sponsored individual rubber groups was given by Division Vice Chairman S. G. Byam, E. I. du Pont de Nemours & Co.

White on Silicone Rubber

THE January 17 dinner-meeting of the Quebec Rubber & Plastics Group at the Queen's Hotel, Montreal, P.Q., Canada, featured a discussion of "Silicones in General, and Silicone Rubber in Particular" by B. B. White, General Electric Co. Approximately 65 members and guests attended the dinner; while 90 were present for the paper which followed.

Using slides and samples to illustrate his talk, Mr. White reviewed the basic chemical principles involved in the manufacture of silicones, then outlined the steps which had been taken in an effort to obtain more rubber-like properties. While these efforts have met with considerable success, the physical properties of silicone rubber are still far below those of natural rubber. Silicone rubber, however, is not to be regarded as a substitute for either natural or other synthetic rubbers, the speaker declared. Its outstanding feature is its resistance to a wide temperature range (-130° to $+600^{\circ}$ F.) which makes it unique among rubber-like materials. Mr. White also stressed the importance of excluding organic oils from silicone rubber since these oils decompose rapidly at high temperatures and degrade the rubber.

The talk was followed by a lively question and answer period. The speaker was introduced by Ralph Harrison, Canadian General Electric Co., Ltd., and thanked by A. Bell, St. Lawrence Chemical Co., Ltd.

Boston Group Ski Outing

THE Boston Rubber Group held its annual week-end ski outing February 8-10 at Mt. Ascutney, Windsor, Vt. An eight-inch snowfall on the evening of February 8 made the outing a most enjoyable one for the 50 members attending. The committee in charge consisted of D. D. Wright, Hood Rubber Co.; W. S. Edsall, Goodyear Tire & Rubber Co.; and A. W. Bryant, Binney & Smith Co.

Turpentine Chemicals

NEW chemicals showing excellent promise for use in the preparation of synthetic rubber, plastics, and many other products have been developed from gum turpentine by the Naval Stores Research Division, United States Bureau of Agricultural & Industrial Chemistry, Olustee, Fla. Recent tests indicate that these chemicals, called terpene hydroperoxides, are particularly suitable for use as catalysts in the production of low-temperature synthetic rubber. One of these chemicals, pinane hydroperoxide, is particularly promising because it is not only a superior catalyst, but also can be produced in exceptionally high yields with relative ease. Menthane hydroperoxide, with properties similar to those of pinane hydroperoxide, can be produced from gum turpentine, wood turpentine, and limonene, a by-product of the citrus processing industry. To assist companies who may be interested in producing terpene hydroperoxides or evaluating potential uses for these new chemicals, small working samples of either pinane or menthane hydroperoxide may be obtained by writing E. L. Patton, Division head.

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RMA Identification Code Numbers

THE mechanical rubber goods manufacturers division of The Rubber Manufacturers Association, Inc., has been selected by the joint technical committee on automotive rubber of the Society of Automotive Engineers and the American Society for Testing Materials to make all future assignments of identification code numbers and symbols for the following rubber and plastic articles:

Molded Goods	Hydraulic Brake
Extruded Goods	Hose
Windshield Wiper	Vacuum Brake
Hose	Hose
Defroster Tubing	V-Belts
Radiator Hose	Brake Lining
Heater Hose	Clutch Facings
Fuel and Oil Line	Electrical Wiring
Hose	Molded Rings

All manufacturers of the above articles who have not already been assigned identification codes or markings should write to J. J. Catterall, executive secretary, mechanical division, The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York 22, N. Y., requesting an assignment.

Benzonitrile Available

COMMERCIAL quantities of benzonitrile, a chemical with a wide variety of potential industrial uses, are again available from Socony-Vacuum Oil Co., Inc., New York, N. Y. A colorless liquid with an almond-like odor, the chemical is produced at the company's Paulsboro, N. J., refinery by a process involving the catalytic reaction of petroleum raw materials with ammonia. While made by the company for some time, production had been limited by a shortage of basic raw materials.

The greatest use of benzonitrile at present is in the manufacture of resins, where its reaction with dicyandiamide yields an intermediate useful in making resins of the melamine type. The physical properties of benzonitrile also indicate potential application in rubber reclaiming to replace mercaptans, and in vinyl compounding as a fugitive plasticizer. Other uses for benzonitrile include the manufacture of dyestuffs, germicides, surface-active agents drug intermediates, plant hormones, and soil sterilents.

New Dust-Free Black

COLLOCARB, a new HMF dust-free carbon black, was announced by J. M. Huber Corp., 100 Park Ave., New York 17, N. Y., through Vice President R. H. Eagles. Collocarb is a combination of 80% Modulex, Huber's HMF black, and 20% process oil. As a result of the intimate blending of oil and black during production, the new product is said to retain the rubber reinforcing characteristics of an HMF black while showing improved processing qualities. Its dust-free properties also make Collocarb desirable for open-mill mixing. The new black is supplied in pellet form in either bulk or 50-pound bag shipments.

Discuss Compression Sets

A TALK on "Compression Sets in GR-S and Natural Rubber" by G. C. Maasen, R. T. Vanderbilt Co., Inc., featured the winter meeting of the Connecticut Rubber Group, held February 15 at the Hotel Barnum, Bridgeport. Approximately 140 members and guests attended the meeting, which included a cocktail hour and dinner.

Mr. Maasen's talk concerned a study made on some of the factors affecting compression set of natural rubber and various types of GR-S compounds tested in accordance with ASTM D395-49T, Method B. The factors studied included modulus, state of cure, various types and combinations of blacks, fillers, combinations thereof, plasticizers, antioxidants.

S. G. Byam, of E. I. du Pont de Nemours & Co., Inc., and vice chairman of the Division of Rubber Chemistry, A. C. S., also spoke briefly on his visits to other Division sponsored rubber groups and the relation of group and Division activities. Entertainment at the dinner was provided by card tricks and feats of magic performed by J. B. Cook, president of Whitney Blake Co.

Officers of the Connecticut Group for 1952 are as follows: chairman, G. R. Sprague, Sponge Rubber Products Co.; vice chairman, F. J. Rooney, General Electric Co.; secretary, Guy DiNorscia, Sponge Rubber Products; and treasurer, W. Fisher, Armstrong Rubber Co. Other directors, in addition to the officers, are C. R. Haynes, Binney & Smith Co.; C. A. Larson, Whitney Blake; T. Fitzgerald, Naugatuck Chemical Division, United States Rubber Co.; R. B. Norton, Kerite Co.; and E. W. Owens, U. S. Rubber.



New Interlining Paper

A NEW interlining paper for use in the rubber industry has been announced by Charles F. Hubbs & Co., New York, N. Y. Called Hubbs releasing paper, the treated paper is designed to adhere, yet strip readily from tacky surfaces. Suitable for use on calendered uncured natural and synthetic rubbers, the rubber sheeting is easily removed even after storage under pressure at elevated temperatures. HRP has no coating to transfer or affect the surface to which it is applied and has no tendency to adhere more firmly even after prolonged contact.

The paper is also recommended as a backing for pressure-sensitive or tacky coatings, as a protective covering during storage, and as a liner for containers of tacky substances when secured to the container with special glues. The paper is available in light and heavy weights, identified by white and blue colors, respectively. In standard rolls 60 inches wide, the lightweight paper sells at 12-14½¢ per linear yard, depending on quantity; while the heavyweight paper ranges in price from 24-29¢ per linear yard. Standard packages are wound on three-inch cores and are nine inches or larger in outside diameter. The master rolls can be furnished slit into widths of four inches or larger at no additional cost. Slit widths of narrower than four inches, as well as cut sheets, can also be furnished.

Certification of Dielectric Heating Equipment

ALL users of induction and dielectric heating equipment, especially that manufactured prior to June 15, 1947, should be aware of the provisions of the FCC Rules and Regulations, Part 18, relating to radiation and communication interference from industrial induction and dielectric heating equipment. In essence, these rules require certification on or before June 30, 1952, of compliance with certain minimum radiation requirements for all equipment installed or manufactured prior to July 1, 1947. A period of five years was allowed by the FCC for users of uncertified equipment to check properly and obtain certification of their equipment. Since the deadline date is now approaching, all such users of uncertified equipment should take due notice and proceed to comply with the rules. The National Electrical Manufacturers Association suggests that users of older-type equipment contact either the manufacturers of the equipment or a consulting engineer for guidance in complying with the rules. A copy of the FCC Part 18 rules may be obtained from the United States Government Printing Office, Washington 25, D. C.

Emmerich A.I.C. Medalist

FRED J. EMMERICH, president of Allied Chemical & Dye Corp., has been awarded the 1952 Gold Medal of The American Institute of Chemists. According to Institute President Lawrence H. Flett, the award was made in recognition of Dr. Emmerich's achievements "as a business leader devoted to building chemical industry by fostering cooperation among men skilled in chemistry, engineering, and commerce." Presentation of the medal will be made at a banquet on May 8 at the Hotel Commodore, New York, N. Y., concluding the Institute's twenty-ninth annual meeting being held on May 7 and 8.

The twenty-fourth recipient of the medal, Dr. Emmerich was born in New York in 1892 and attended New York University. He joined a subsidiary of Allied Chemical in 1920 and subsequently became comptroller, then vice president, and finally, in 1946, president of the corporation. He is a member of the chemical industry advisory committee of the United States Munitions Board and is a director of the Manufacturing Chemists' Association.

Movies at Fort Wayne

APPROXIMATELY 150 members and guests of the Fort Wayne Rubber & Plastics Group attended a regular dinner-meeting January 24 at the Van Orman Hotel, Fort Wayne, Ind. The technical session consisted of showings of two films, "A Study in Black," by Godfrey L. Cabot Co., and "The Story of Tenite," by Tennessee Eastman Co. After-dinner speakers were Murray Mendanhall, coach of the Duffy Packers, and Robert Nulf, coach of Northside High School, who discussed their experiences in sports and coaching and answered questions from the floor.

NEWS of the MONTH

GSA Ends Role as Exclusive Natural Rubber Buyer; Immediate Leasing of Government Synthetic Rubber Plants Urged

After a month in which its rubber buying policy became increasingly "tough" as far as quality and price, the General Services Administration announced February 23 it was terminating its role as exclusive buyer and importer of natural rubber for the United States on that date. Conditions for return of natural rubber buying to private industry were outlined, but consumption was still governed by the National Production Authority's Rubber Order M-2.

A revision of M-2 lifted the 30-day inventory limit required of purchasers of GR-S and authorized an approximate 20% increase in the amount of high-tensacity rayon which may be used by rubber goods manufacturers.

Neither the Senate nor the House Armed Services committees had scheduled hearings on the President's recommendation for extension of the Rubber Act of 1950, as of late February.

Plant expansion programs for large tires and high-pressure hydraulic hose were approved by the Defense Production Administration in February. The goal approved for these programs was \$25 million dollars, and the target date was set at January 1, 1955.

The Rubber Manufacturers Association, Inc., asked Congress in February to exclude rubber products from a proposed Manufactured Fiber Products Labeling Act, a request that apparently will be granted.

H. E. Humphreys, Jr., president of United States Rubber Co., recommended that the government immediately offer private industry an opportunity to lease all government-owned synthetic rubber plants, including feedstock facilities, as a step toward eventual sale of the plants to private operators.

RMA predicted, as a result of a survey of retail tire sales during 1950 and 1951, that replacement tire sales should return to their normal pattern in 1952 and that the replacement passenger-car tire business should show substantial improvement.

Washington Report

By

ARTHUR J. KRAFT

GSA and Natural Rubber

The United States Government began throwing its weight around in the world rubber markets in February. The once desperate condition of the natural rubber stockpile, through more than a year of accelerated government buying, has reached a point where it could be called safe and even fairly comfortable. The GSA, exclusive buyer for the stockpile and industry for the past 14 months, furthermore, was getting ready throughout February to let industry back into the rubber buying business and slow down GSA remaining stockpile buying activity.

On January 28, GSA announced completion of arrangements for the transfer

of 25,000 long tons of natural rubber from United Kingdom strategic stocks to the U. S. stockpile. Delivery will take place over the "forthcoming months with payment to be on the basis of present American buying prices"—48.5¢ a pound for #1 RSS at the time of the announcement. GSA said that the transfer from one nation's stockpile to another's "will in no way affect procurements for strategic stocks" which the two governments would otherwise have made. It noted that the transfer will accelerate the completion of the U. S. stockpile.

Shortly thereafter the on-again, off-again efforts at negotiating a rubber purchase contract with Ceylon were widely rumored to be back in full swing, with the Ceylonese making the inquiries. Six months ago such negotiations actually were taking place, but came to an abrupt halt when the U. S., protesting some pretty extravagant reports appearing in the Ceylon press on the progress of the talks, pulled out. The State Department informed Ceylon that it could not negotiate under the daily scrutiny of that country's press. The latest rumor, reported from London last month, was that Ceylon was willing to discuss a fairly large tonnage at market prices. Neither the Ceylonese Embassy nor the State Department would comment on this rumor.

According to the unconfirmed report, Ceylon also is seeking as a *quid pro quo* U. S. assistance in getting steel for Ceylon's industry. Regardless of the merits of any rubber deal with Ceylon, it would seem that the first matter which would have to be cleared up is Ceylonese exports of rubber to Communist China. Under the Battle Act, passed by Congress a few months ago, the U. S. may not grant materials aid to countries trading in strategic materials with the Communist bloc. Presumably this point has been called to the attention of the Ceylonese by our State Department.

GSA, for its part, said it was unaware of any actual negotiations with Ceylon, but reported that it had recently forwarded to the State Department, presumably for guidance in any such informal talks, the conditions and terms under which GSA would buy rubber from the governments of producing countries. Foremost is a firm assurance of delivery and preferably a contract calling for the entire output of the country.

GSA, upon completion of the rubber transfer deal with Britain, began to apply the screws in earnest, reducing its buying prices steadily throughout February and confining its purchases to the top three grades. Despite these measures it was able to buy plenty of rubber. In mid-February the agency notified its Singapore shipping agents that it would reject any rubber which failed to meet specifications as set out in purchase contracts, level a minimum 3% penalty on rejected rubber, and, in effect, impound such rubber on arrival here—putting it in escrow, with payment deferred until private buyers take it after GSA quits its exclusive buying role. Domestic buying agents, it was said, were informed they could invoice the rubber back to the shipper at the con-

tract price if it failed to meet specifications.

News of these "get tough" measures evoked from Singapore dealers complaints that the penalties were "harsh" and a threat to withhold offers from GSA until these "new" conditions were "clarified"—according to a Reuters dispatch from Singapore on February 13. GSA responded that the conditions really weren't new, but constituted only a stricter application of existing contract terms. As for the threatened seller strike, GSA said that it had been offered 12,000 tons of rubber at Singapore that very morning, but turned it down "because we didn't feel like buying rubber today." An agency spokesman made it clear that GSA has become much more "choosy" in buying. The subsequent falling off in the Singapore market, coupled with GSA's ability to buy what it wanted to, would seem to support the conclusion that GSA is doing pretty well with its tougher stance. Around Washington, GSA has been letting out word that it has the rubber situation well in hand and considers its rubber job just about finished, except for the shouting.

Just how to let the public at large in on its achievements has been occupying the agency's officials for several weeks. At mid-February, GSA had a pretty fair idea of how and when it would quit as exclusive buyer, but wanted to make the announcement a major production. In preparation, it set its accountants and buying agents to drawing up a complete record of purchases under the exclusive buying program, price paid and prices at which it sold, day-by-day since January, 1951. The data, however, showed that GSA actually did a little better than a "no profit, no loss" business, at least in the early stages of the program when it held its resale price to 66¢ a pound for #1 RSS.

The agency's statisticians and accountants throughout February were working hard at trying to reconcile the profits shown on its books with GSA's longstanding propaganda pitch of "no profit, no loss" and the many promises that all savings developed through the exclusive buying program would be immediately passed on to consumers. GSA said that it had under consideration another decrease in the resale price to consumers, but had come to no decision at the time. The prospects are considered pretty firm that GSA will lower its price probably fairly substantially and probably effective with April deliveries. Even at the time when the decision was made to cut the price 1½¢ a pound with February deliveries, GSA intimated that it expected to make a further cut before stepping out of the rubber picture. Odd as it may seem, GSA evidently is determined to avoid turning over a healthy financial profit to the Treasury when it closes out its rubber program.

The world rubber markets, as reflected by inquiries reaching Washington, were on edge by late February, fully convinced that GSA's days as a heavy customer were numbered and wondering whether Uncle Sam could be depended upon to

free existing reins on a potentially large U. S. market. Officials of a number of U. S. agencies concerned with rubber, including the GSA, seemed well aware of the dangers to market stability in the Far East, but apparently planned no great relaxation of restrictions on natural rubber consumption to follow directly on the heels of GSA's withdrawal. As far as it could be learned, the government will permit the consumption of dry natural rubber to increase only about 10% over the first-quarter rate for the remainder of 1952. This would mean an average monthly consumption rising from the first-quarter rate of 35,000 long tons of dry natural rubber a month to about 38,500 long tons for the nine remaining months. If buying for the strategic stockpile is conducted at a slower rate, it would appear that the total U. S. market for natural rubber might be smaller in 1952 than in 1951.

On February 23, GSA announced that the stockpile position on crude natural rubber has reached safe levels, and the government would surrender its exclusive procurement authority beginning on that day.

Jess Larson, General Services Administrator, said the market was being returned to private hands "now that the conditions which impelled the government to act as exclusive buyer and importer no longer exist." He described these conditions as "deficiencies in the stockpile and the fact that the price of rubber in the world market was too high."

The Defense Production Administration and the NPA will continue to exercise their controls on the use of natural rubber.

GSA undertook the exclusive role on December 29, 1950, after industry representatives had been consulted, and the DPA authorized the move. Rubber at that time was selling on the world market at nearly 80¢ a pound. The world market price in late February was about 38¢ a pound.

In order to insure an orderly transition from exclusive public purchase to private purchase and to restore normal trade operations with the least possible dislocation, Larson said the following program had been adopted by the government.

(1) The control over the consumption of natural rubber, which is under the administration of the NPA, and the restriction on inventories of natural rubber in the hands of manufacturers' to two months' consumption requirements will be continued by that agency until further notice.

(2) The GSA will make available to industry for consumption requirements a total of not to exceed 35,000 tons of natural rubber monthly during April and May and 20,000 tons during June.

(3) Dealers and manufacturers together will be permitted to import not to exceed 30,000 tons of natural rubber—15,000 tons for dealers collectively and 15,000 tons for manufacturers collectively—for arrival in the United States during the month of June under licenses to be issued by GSA. Dealers and manufacturers who desire to avail themselves of this opportunity must advise the GSA not later than March 5, 1952, of the tonnage and grades which they wish to import during June. Upon receipt of this information, the requests will be analyzed, and thereafter appropriate allocations will be made.

(4) Commencing July 1, 1952, the rubber manufacturing industry will be required to satisfy all its consumption requirements for natural rubber through private sources or alternately by the pur-

chase of rubber which may be made available from time to time by the United States Government under its rotation program.

(5) The Commodity Exchange will be permitted to reopen immediately, but the earliest trading to be permitted will be for delivery during the month of September, 1952.

(6) Free trading in rubber is permitted immediately, subject only to the limitation with respect to the purchase of rubber for June arrival and any other restrictions which may be contained in M-2.

(7) The foregoing program relates to dry natural rubber only. In the case of natural rubber latex, a free market will not be declared until such time as presently held GSA stocks have been disposed of.

M-2 Revision

NPA last month lifted the 30-day inventory limit governing purchasers of GR-S and authorized an approximate 20% increase in the amount of high-tenacity rayon which may be used by rubber manufacturers.

The actions were taken by amendment to Rubber Order M-2, effective February 4. The amendment also made some changes, characterized by NPA as of minor importance, in the Appendix "A" manufacturing specifications.

With consumers no longer required to limit their GR-S stocks to a 30-day supply, inventory restrictions on that material are now confined to the provisions of NPA Regulation 1, which specifies that inventories be held to a practicable working minimum.

NPA said this inventory action will benefit many smaller rubber goods manufacturers who have been forced to buy less than carload lots of GR-S under the 30-day limit provisions. The more lenient restrictions of a practicable working minimum stock level will enable these manufacturers to buy in carload lots from RFC, saving on freight charges and avoiding the necessity of working their GR-S stocks down to abnormally low and impracticable levels.

The agency said it relaxed the inventory restriction because RFC's stocks of GR-S have increased from about 20,000 tons last June to 42,000 tons at the end of January. As M-2 now stands, manufacturers' stocks of butyl rubber are limited to a 30-day supply and of dry natural rubber to a 60-day supply.

Rubber goods manufacturers were authorized to use more high-tenacity rayon because, NPA said, producers of this rayon are increasing their annual production rate from 325 million pounds as of last July to an anticipated 400 million pounds by April, 1952, through increased capacity and conversion of textile rayon facilities. Another reason for more liberal treatment is that the military demand for high-tenacity rayon has not reached previously expected levels.

As revised, M-2 now permits each manufacturer to consume high-tenacity rayon at 120% of his consumption during the second quarter of 1951. This new, higher ceiling includes rayon used for Defense Department and Atomic Energy Commission contracts and is effective with the first calendar quarter of this year. Before using any high-tenacity rayon in civilian rubber products, the manufacturer must set aside a quantity sufficient to comply with the manufacturing specification of rubber products he intends to make that quarter for delivery to the Defense Department and the AEC.

Under the old M-2, the permitted quarterly usage was 100% of the average of the first two quarters of 1951, a less representative period industry-wide than the second quarter taken alone, the NPA explained. The old M-2 excluded the requirements of the Defense Department and the AEC in calculating permissible usage.

NPA stated the rubber industry used about 70 million pounds of high-tenacity rayon (singles, yarn, plies, cord, and corded fabric) during the second quarter of 1951. During the first quarter of 1952, it said, production is estimated at 93 million pounds, and the rubber industry will have available for its use about 91 million pounds.

As for the changes in Appendix "A," NPA reported they arose out of the need of clarifying certain product designations. Most of the revisions are breakdowns of past product designations and result from the need of including products not specifically mentioned in the past. Only eight product classifications were affected. One revision permits 75% natural rubber content for pipe coupling gaskets of 55 durometer hardness and below and 50% for those of greater hardness. Previously the limit had been 65% for all pipe coupling gaskets.

Rubber Legislation

As of late February, neither the House nor Senate Armed Services committees had scheduled hearings on, or other consideration of, the President's recommendation for extension of the national rubber policy law.

On the Senate side, where the matter is expected ultimately to rest with the Armed Services Preparedness subcommittee, the recommendation has not received even preliminary study at this point. The House committee reported that it was in no rush to take up a rubber bill in view of the press of more urgent matters, such as the universal military training bill. The Rubber Act of 1950, now on the books, is slated to expire on June 30, 1952.

Although the House committee is expected to take up the rubber act extension first, this plan is still not definite. Moreover there is still no assurance that either body will conduct hearings upon the President's recommendations. He has asked for a two-year extension of the present law as it concerns GR-S facilities, production and consumption, and authority for immediate disposal and decontrol of butyl rubber.

While not commenting directly on the President's recommendations for sale of the butyl rubber facilities, an official of the Senate Preparedness subcommittee noted that this group has given more attention to GR-S than to other types of synthetic rubber. It has been more concerned with GR-S over the past 20 months because it was aware that the GR-S situation was more critical insofar as national security has been involved. Butyl rubber production, it has assumed throughout its continuing study of the rubber situation, was in better shape.

Thus, this spokesman said, the subcommittee will have to look afresh into the butyl rubber situation before determining whether it favors the President's proposal for pulling the government out of the butyl rubber picture.

(On February 26, Rep. Carl Vinson, chairman of the House Armed Services Committee, introduced HR 6187, which calls for a flat two-year extension of the Rubber Act of 1950.)

Industry Expansion

In February, DPA approved plant expansion programs for the tire industry and for high-pressure hydraulic hose.

It authorized the tire industry to add facilities so that by January 1, 1955, the nation's capacity will reach 60,000 units a day of airplane, truck, bus, tractor, and implement tires requiring curing presses of 55 inches or larger.

It set the same target date for bringing production capacity for horizontal wire braided hose to 70 million feet.

While current figures were unavailable, DPA reported that as of January 1, 1950, the industry was capable of producing 37,500 units in the size and types covered by the program. As of January 1, 1951, capacity existed for producing 25 million feet of horizontal wire braided hose.

DPA acted upon recommended expansion programs drawn up within the agency and based on studies made by the NPA—DPA's operating wing.

The approval of these programs does not, by itself, constitute a commitment of regularly scheduled government assistance in acquiring materials to make good on the expansion goals, or of special government tax incentives. Such assistance is implied, however, since the goals were set with the probable long-range defense needs in mind.

At the time of decision DPA had on file applications for rapid tax amortization covering tire expansion projects costing some \$100 million. The goal approved by DPA probably will cost in the neighborhood of \$25 million. The DPA decision, in effect, rules out special government incentives or materials aid for passenger-car tire expansion and other tires utilizing curing presses under 55 inches. The applications for tax aid amounting to about \$100 million represent the total filed by the tire industry since the Korean outbreak.

GR-S Export

The Office of International Trade disclosed last month that it had licensed 16,153 long tons of GR-S for export to 33 countries, against a first-quarter export quota of 17,000 tons. The agency declared it would license the remaining 847 tons among exporters who applied for licenses before the January 7 filing deadline. Pending late applications, OIT said, amount to 7,500 tons. Thus applications were filed for permission to export at least 24,500 tons.

As reported on February 7, the amounts of GR-S licensed, by countries, against the first-quarter quota, in long tons, follow: Argentina, 1,088; Australia, 614; Austria, 225; Belgium, 489; Brazil, 1,500; Chile, 224; Colombia, 120; Cuba, 93; Denmark, 15; El Salvador, 3; Finland, 5; France, 1,440; Germany, 2,045; Greece, 44; Guatemala, 4; Holland, 47; Israel, 179; Italy, 1,790; Japan, 2,000; Luxembourg, 179; Mexico, 594; Norway, 67; Pakistan, 10; Peru, 201; Philippines, 27; Portugal, 116; South Africa, 871; Spain, 446; Sweden, 671; Switzerland, 419; Turkey, 134; Uruguay, 124; and Venezuela, 379.

OIT began in late February to license the remaining 847 tons of the first-quarter export quota. It has informed prospective applicants for second-quarter export licenses that applications will be accepted during the current quarter for processing after a second-quarter quota has been established. Inter-agency conferences were to begin in late February to determine

the size of the second-quarter quota. OIT also will hold over pending late applications for part of the first-quarter licensing against the second-quarter quota. As noted, these amount to about 7,500 tons.

Reid Leaves RFC

James Reid, technical director, Office of Production, Reconstruction Finance Corp., left that post on February 15 to return to Phillips Petroleum Co. Reid came to RFC as assistant to G. C. Oberfell, director of the Office of Production, in December, 1950, and remained during the entire course of the Symington regime. Dr. Oberfell came out of retirement to act as consultant to the old five-man board of directors of RFC which was replaced by a single administrator in April, 1951. He served many years as research director for Phillips Petroleum.

In late February, RFC was still without a permanent administrator although the nomination of Harry A. McDonald, former chairman of the Securities & Exchange Commission, finally had cleared for a Senate floor vote. W. Stuart Symington left only a day or so before Reid, leaving top administrative management to the RFC's treasurer. As technical director, Reid shared with Arthur Barrows in overall supervision and planning of the synthetic rubber program during the period when production was doubled through the reactivation of standby facilities and in-plant improvements.

Barrows, a former president of Sears Roebuck and Symington aide during the latter's career as Air Force Secretary, remains, at this writing, as director of the Office of Production which has charge of the synthetic rubber, tin, and abaca fiber programs.

Gerald B. Hadlock, former director of the Synthetic Rubber Division, RFC, is now chief of purchases for that division. Hadlock's present position is on the same level as that of the heads of the production and sales branches, Munster and Morgan, respectively, and all serve as deputy directors under Leland Spencer, director of the Synthetic Rubber Division.

RFC January Sales

January sales of synthetic rubber and synthetic rubber latex, made public late in February by the Synthetic Rubber Division, RFC, were as follows: Total GR-S, including latex, 58,648.8 long tons. Of this total 23,293 long tons were sold (LTP) GR-S; 8,224.9 tons were black masterbatch; 2,958.1 tons were oil masterbatch; 1,460.3 tons were oil-black masterbatch; and 2,821.6 tons, dry weight were GR-S latices; the balance was standard GR-S. Butyl rubber to the extent of 6,099.5 long tons was sold.

The above figures for masterbatch rubbers are in terms of gross weight, i.e., the weight of the material including the black and/or oil as distinguished from net weight figures for the GR-S alone.

Replacement Tire Price Decontrol Asked

The tire industry, through its Tire Industry Advisory Committee to OPS, petitioned that agency for immediate decontrol of replacement passenger-car and truck and bus tires on February 26, contending that tires are plentiful and have been selling below ceilings for some time.

In an RMA release on this subject it was pointed out that "a dramatic right-about-face in the supply and demand picture calls for immediate removal of tire price controls." It was added that while rubber and tires were critically short at the time of the general price freeze in January, 1951, the government has reached its first goal on the natural rubber stockpile; synthetic rubber production is in excess of domestic demand; tire inventories are now adequate, and tire manufacturing facilities are also in excess of present demand.

The committee also pointed out that the NPA already had lifted its limits on tire production and reminded the OPS of its own "publicly declared policy . . . to decontrol any segment of the economy when price pressures have largely disappeared."

OPS said that it would take the petition "under consideration."

RMA Opposes Fiber Labeling Act

RMA asked Congress in February to exclude rubber products from a proposed Manufactured Fiber Products Labeling Act, a request that apparently will be granted.

The request was made by W. J. Sears, RMA vice president, in testifying before the Senate Interstate & Foreign Commerce Committee on February 18, on S. 1267. This measure was introduced last year by Sen. Theodore Green (D., R.I.) and generally has drawn the opposition of the textile industry. The Federal Trade Commission, which would administer the proposed act, has endorsed it.

Sears questioned whether the bill, which closely parallels the Wool Products Labeling Act of 1939, was intended to cover all rubber products containing manufactured fibers. He said that apparently, Senator Green intended to make the labeling requirements applicable to items of apparel and household and decorator fabrics.

Chief purpose of the bill is to permit the consumer readily to identify the types of synthetics going into the articles he purchases. Sears pointed out that synthetic fibers are used by the rubber industry to meet service requirements, and that the user of rubber products is interested in the serviceability of the product rather than an analysis of its various component materials.

The RMA took exception to several labeling provisions. These are: (1) that the manufacturer's label set out the percentage content of synthetic fibers; (2) that loading materials such as rubber, carbon black, and chemicals be identified, and the content specified; (3) that the label identify the manufacturer of the product.

The first requirement, RMA said, would place a "difficult and unintended burden upon the rubber goods manufacturing industry." The type of information required in showing the percentage content of loading materials "is a closely guarded trade secret with many manufacturers," it was said, noting that the industry "uses more than a thousand different chemicals in the preparation of thousands of different compounds used in the manufacture of some 50,000 different rubber products." As for identifying the manufacturer, Sears pointed out that this requirement of the bill "would upset a long-standing trade practice in the private brand business by requiring the manufacturer who makes goods utilizing manufactured fibers for other sellers to show his name on the

is subject it product." The proposed bill would not apply to a manufacturer making the same product, but utilizing natural fibers, such as cotton.

Sears asked the committee either to make a positive statement that the intent of the bill is to cover only garment and decorator fabrics or to write specific exemptions for rubber products. The definition RMA proposed for rubber products apparently would leave under the act such items as rubber-coated raincoats. It would exclude from the act, along with all other rubber products, rubber footwear containing manufactured fibers as a component material for reinforcing, binding, or structural purposes.

At the conclusion of the public hearing, the committee chairman, Sen. Edwin Johnson, of Colorado, agreed with the RMA position that the sponsors of the bill did not intend that it cover rubber products and assured the RMA that the exemption would be provided, probably through the adoption of the amendments proposed by Sears to write in specific exemptions.

No further action on the bill has been scheduled by the committee, although further hearings may be held to give others an opportunity to testify.

—A.J.K.

Other Industry News

Humphreys on White Sidewalls

In another statement in mid-February, Humphreys, of U. S. Rubber, declared that the government ban on production of white sidewall tires should be removed immediately because it is causing black markets and international traffic in white sidewalls. He said production could be started 30 days after the ban was lifted.

"The National Production Authority stopped production of white sidewalls one year ago to save natural rubber for the stockpile," he said. "That stockpile is now at a safe level, and there is no longer any justification for a continuation of the restrictions."

Humphreys stated the rubber industry is experiencing a persistent demand for white sidewalls from car owners and tire and automobile dealers. He asserted that white sidewall tires are coming into the United States from other countries and are being sold at excessive prices by a few dealers to the disadvantage of the majority of dealers and domestic manufacturers.

Figures were released by Humphreys to show that most white sidewalls in the United States today are used on the smaller, less expensive cars, and not the luxury cars, as generally believed. White sidewalls are used on 28% of the Chevrolet, Ford, Plymouth, etc. cars; on 30% of the Dodge, Mercury, Pontiac etc. cars; on 27% of the Buick, Chrysler, etc. cars; and on 15% of the Cadillac, Lincoln, etc. cars.

The average white sidewall tire uses only one more pound of natural rubber than an all-black tire, Humphreys said. If manufacture is resumed, he estimated that the industry would need only 500 additional tons of natural rubber per month, 1.4% of current total consumption, and this requirement may be reduced by the use of neoprene synthetic rubber in combination with natural rubber. He said there is an adequate supply of pigments and chemicals used in white sidewalls.

A few days before the statement by Humphreys on white sidewalls, E. D. Kelly, director of the NPA rubber divi-

sion, wrote Representative Bender, Ohio Republican, who asked why the ban continued in force "at a time when Canadian rubber companies are turning them out in great quantities" for sale in the United States.

Kelly explained that the ban was ordered because "industry practice" has been to use a high proportion of top-quality natural rubber in making white sidewalls. "To permit their return would mean the relaxation of the government's stockpiling program," Kelly added.

Recommends GR-S Plant Leasing

Humphreys on January 31 recommended that the government immediately offer private industry an opportunity to lease all government-owned GR-S synthetic rubber plants, including feedstock facilities, as a step toward eventual sale of the plants to private operators.

Humphreys also recommended that the Act of 1950, which expires on June 30, 1952, be amended to give the government authority to sell the plants to qualified operators, and that it be extended for a maximum of one year to June 30, 1953, at which time the offer to sell would become subject to immediate acceptance.

"I make these recommendations," Humphreys said, "sharing the same belief which prompted Congress to declare in the original legislation of 1948 that 'the security interests of the United States can and will best be served by the development within the United States of a free, competitive enterprise' and further that 'government ownership of production facilities . . . be ended and terminated whenever consistent with national security.'"

"In my opinion, there is now no problem of national security stemming from the rubber situation. We already have enough natural rubber in the stockpile to carry us through a five-year war, and we are producing so much rubber in our synthetic plants that we are exporting it. The problem, if any, is that the United States will have more rubber in 1952 than it will know what to do with. Although it is expected that the nation will consume about 1,400,000 tons of natural and synthetic rubber this year, to set a new record, we will have available at least a quarter of a million tons more than we can possibly use.

"Under these conditions, I feel that the sooner the government gets out of the rubber business the better. For it is the history of our country that progress comes not from government control, but from private enterprise.

"The way to start is to lease the plants to private industry at once. The present law permits leasing. I can see no reason for further delay. I believe that most rubber goods manufacturers would prefer a lease arrangement because it would give them an opportunity to ascertain operating costs under private management. This information is necessary to enable the government and prospective buyers to determine accurately a plant's actual value."

RMA Tire Business Survey

As a result of a survey of retail tire sales during 1950 and 1951, two highly erratic years for the tire industry, the RMA statistical committee concludes that the replacement passenger-car tire business should return to its usual sales pattern in 1952, and retail sales should show a substantial improvement. While business in the first quarter of 1952 is expected to be lower than for last year, because of scarce buying then, the second and third quarters

CALENDAR

- Mar. 1-31. The 1952 Red Cross Fund Campaign.
- Mar. 17-19. National Association of Waste Material Dealers, Inc. Thirty-Ninth Annual Convention. Waldorf-Astoria Hotel, New York, N. Y.
- Mar. 19. New York Section, SPE. Hotel Gotham, New York, N. Y.
- Mar. 20. Washington Rubber Group. Commercial Chemical Development Assn. Annual Meeting. Statler Hotel, New York, N. Y.
- Mar. 20-22. Division of High Polymer Physics, APS. Columbus, O.
- Mar. 21. Chicago Rubber Group. Morrison Hotel, Chicago, Ill.
- Mar. 22-23. Chicago International Trade Fair. Navy Pier, Chicago, Ill.
- Mar. 23-27. American Chemical Society. National Meeting. Buffalo, N. Y.
- Mar. 27. Fort Wayne Rubber & Plastics Group. Van Orman Hotel, Fort Wayne, Ind.
- Apr. 1. The Los Angeles Rubber Group, Inc. Hotel Mayfair, Los Angeles, Calif.
- Apr. 1-4. American Management Assn. National Packaging Exposition and Conference on Packaging, Packing, and Shipping. Auditorium, Atlantic City, N. J.
- Apr. 3. Northern California Rubber Group.
- Apr. 4. Akron Rubber Group. New York Rubber Group. Henry Hudson Hotel, New York, N. Y.
- Apr. 9. Newark Section, SPE. Military Park Hotel, Newark, N. J.
- Apr. 9-11. SPI Reinforced Plastics Division. Seventh Annual Technical Session. Edgewater Beach Hotel, Chicago, Ill.
- Apr. 10. Elastomer & Plastics Group. Northeastern Section, A. C. S.
- Apr. 16. Washington Rubber Group. New York Section, SPE. Hotel Gotham, New York, N. Y.
- Apr. 17. Rhode Island Rubber Club. Metacomet Golf Club, East Providence, R. I.
- Apr. 22. Association of Consulting Chemists & Chemical Engineers. General Symposium. Belmont Plaza Hotel, New York, N. Y.
- Apr. 25. Detroit Rubber & Plastics Group, Inc., Detroit Leland Hotel, Detroit, Mich.
- Apr. 30-May 1-2. Philadelphia Rubber Group. Poor Richard Club, Philadelphia, Pa.
- May 1-2. Division of Rubber Chemistry, A. C. S. Cincinnati, O.
- May 2. Chicago Rubber Group.
- May 6. The Los Angeles Rubber Group, Inc. Hotel Mayfair, Los Angeles, Calif.
- May 7-8. The American Institute of Chemists. Twenty-Ninth Annual Meeting. Hotel Commodore, New York, N. Y.
- May 8. Northern California Rubber Group.
- May 9. Connecticut Rubber Group.
- May 14. Newark Section, SPE. Military Park Hotel, Newark, N. J.
- May 21. Washington Rubber Group. New York Section, SPE. Hotel Gotham, New York, N. Y.

should be approximately 66% above 1951 figures. Another sudden war scare, however, would, of course, make 1952 as much of a freak as the previous two years.

Nearly all of the tires snapped up by car owners because of the Korean war scare came out of basements and garages and went on to cars in 1951, thus clearing the decks for a normal tire year in 1951.

To get a perspective on what has happened, and is likely to happen, industry observers have charted retail tire sales as they probably *would have been* if there had been no scare buying. Alongside these figures they have placed their estimate of what *actually did happen*. The contrast between normal and actual provides some useful facts and conclusions for tire manufacturers and dealers:

1. There were two waves of scare buying—a sharp one in July and August, 1950, when some 6,500,000 excess tires were sold; and a second one in December, 1950, January and February, 1951, when some 4,000,000 extra tires were sold.

2. Following both of these periods, retail sales dropped below normal. They have been below normal ever since the second wave of scare buying.

3. During the many months of subnormal sales, nearly all the excess tires in consumer hands have been absorbed by normal automobile usage.

4. Retail sales in 1952 should be close to "normal"—now estimated at around 45,000,000 units.

5. A normal pattern in 1952 will mean first-quarter sales markedly lower than a year ago, because of the scare buying in January and February, 1951.

6. *Second- and third-quarter sales should be around 66% greater than for last year.*

7. To handle this bulge in business in the second and third quarters, dealers will need to build inventories substantially during the first quarter.

The so-called figures for periods during the year are determined by applying 1948-1949 retail seasonal patterns to the assumed normal retail sales for the year. Estimates of what actually happened on the retail sales front are based on known experience of leading tire retailers.

Buys N-E Machinery Division

Aetna-Standard Engineering Co., Frick Bldg., Pittsburgh, Pa., through President E. E. Swartsweiler, has announced the purchase of the rubber and plastics machinery division of National-Erie Corp., Erie, Pa., wholly owned subsidiary of Bucyrus-Erie Co. The purchase includes the drawings, patterns, and special equipment required in the manufacture of this machinery.

Aetna-Standard will manufacture the rubber and plastics machinery in its Warren, O., plant; while sales, design engineering, and development work will be handled by its associate, Hale & Kullgren, Inc., Akron, O. Some of the products which will be made include washing, cracking, sheeting, and refining mills; extruders; Banbury mixers; strainers; insulators; hydraulic platen presses; vulcanizers and devulcanizers; Simplex quick-opening vulcanizer doors; laboratory equipment; and special machinery to customer's specifications. The rubber and plastics line will supplement Aetna-Standard's existing line of fabricating machinery for steel, copper, brass, and aluminum.

EAST



Wesley D. Schroeder

Schroeder in New Post

Wesley D. Schroeder has been appointed supervisor of plasticizer research at Pittsburgh Coke & Chemical Co., Grant Bldg., Pittsburgh 19, Pa., and will be responsible for the supervision of the research and development activities and technical service for the company's rapidly expanding plasticizer division. Dr. Schroeder formerly was engaged in plasticizer research for Rohm & Haas Co. and previously had been with General Electric Co. and Dow Chemical Co., working on plasticizers and the synthesis of organic chemicals. He has also published numerous articles on plasticizer and resin research and evaluation and taken out patents in this field.

Expansion Program Progressing

Pittsburgh Coke has announced that new facilities to increase substantially its production of plasticizers are rapidly nearing completion at its Neville Island plant. The storage tank farm and drumming-off building of the new unit are completed, and the processing building is expected to be finished and in operation before June. The processing building will be equipped with the latest production and control equipment for the manufacture of the company's PX plasticizers. Phthalic anhydride, a basic ingredient for many of these plasticizers, will be supplied in molten form from the company's adjacent phthalic plant. The storage tank farm will be used for storing both raw materials and finished plasticizers.

Witco Chemical Co., 295 Madison Ave., New York 17, N. Y., has appointed Earle T. Runcie manager of the purchasing department for Continental Carbon Co., Continental Oil Black Co., and Barnhart Hydrocarbon Corp., with headquarters at Amarillo, Tex. Previously Mr. Runcie had been vice president of Belvend Mfg. Co. During World War II he was associated with the U. S. Army Ordnance Department as a procurement engineer and chief of the Priorities Expediting and Disposal Board.

Completes New Plant

A major expansion of facilities for the manufacture and sale of rubber latex and plastic materials on the West Coast was announced February 18 by Naugatuck Chemical Division, United States Rubber Co., Rockefeller Center, New York 20, N. Y. A new plant has been completed on Telegraph Rd., Los Angeles, Calif., which will be the division's western sales headquarters. The plant will also contain customer technical service laboratories, facilities for the compounding and storage of natural and synthetic rubber latex, and facilities for warehousing resins, plasticizers, rubber chemicals, agricultural chemicals and other Naugatuck Chemical products.

Naugatuck Chemical first set up a plant on the West Coast in 1946. The new plant will enable the division to keep pace with its rapidly expanding volume of West Coast sales.

Personnel Notes

John P. Coe, vice president and general manager of Naugatuck Chemical, will receive the 1952 award of the Commercial Chemical Development Association on March 20 at the annual meeting of the Association at the Hotel Statler, New York. The award is presented annually to the person in the chemical and chemical process industries who has performed outstanding service and work in commercial chemical development.

Willard deCamp Crater, Jr., has been appointed chief of the thermoplastics section, Chemical Division, NPA. Assistant manager of vinyl sales for Naugatuck Chemical, Crater has been given a leave of absence by the company in order to assume the government post. He brings to his new position a wide experience in plastics research and manufacturing, having previously been associated with such firms as Hercules Powder Co., Federal Telephone & Radio Corp., and the Glenn L. Martin Co. He holds numerous patents on plastics used in the wire and cable industry and in other fields.

New Runway Coating

Airfield runways and taxi strips "softened" by jet fuel spillage can now be protected with a coating of new plasticized synthetic rubber and tar blend developed by Naugatuck Chemical. Test strips of the new material, called Surfa-Aero-Seal, are being installed at Hunter Air Force Base, Savannah, Ga., together with strips of other materials. The rubber-tar blend, it is claimed, is unaffected by searing jet blasts, has the stability to withstand high wheel loads, and gives a densely graded, relatively non-skid surface. The rubber is mixed with selected tar cement in the hot melt phase, producing a homogeneous mixture. It is shipped to construction sites where it is mixed with aggregate, laid with regular paving equipment, then rolled and compacted with tandem rollers. A coating one to 1½ inches thick is applied to asphaltic cement pavements.

H. Muehlstein & Co., Inc., 60 E. 42nd St., New York 17, N. Y., this year is celebrating its forty-first anniversary.

Herman Muehlstein, chairman of the board, H. Muehlstein & Co., is chairman of the rubber and plastics section, commerce and industry division, 1952 New York Heart Campaign.

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Uniform gage maintained with calender rolls on TIMKEN® bearings

Roll neck wear is eliminated

WITH calender rolls mounted on Timken® tapered roller bearings, the gage of plastic film and rubber sheeting is maintained longer than is possible with sleeve type bearings. Rolls stay in accurate alignment maintaining uniform gage the length and breadth of the sheet.

Since there is no friction between roll neck and bearing, roll neck wear is eliminated. Calenders maintain precision with fewer overhauls. And downtime is minimized since roll necks don't require machining.

The true rolling motion of Timken bearings, plus the smooth surface finish of rollers and races, virtually eliminate friction. Wear within the bearing is negligible, calender roll precision is maintained for longer periods of time.

With Timken bearings, calenders can hold gage to minimum tolerances. Yield is increased — you get more yards per pound. Tapered construction of Timken bearings permits them to take radial and thrust loads in any combination. And due to line contact between rollers and races, Timken bearings have load carrying capacity to spare.

Get the advantages of Timken bearings in your calenders, mills, refiners and mixers. For full information, write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

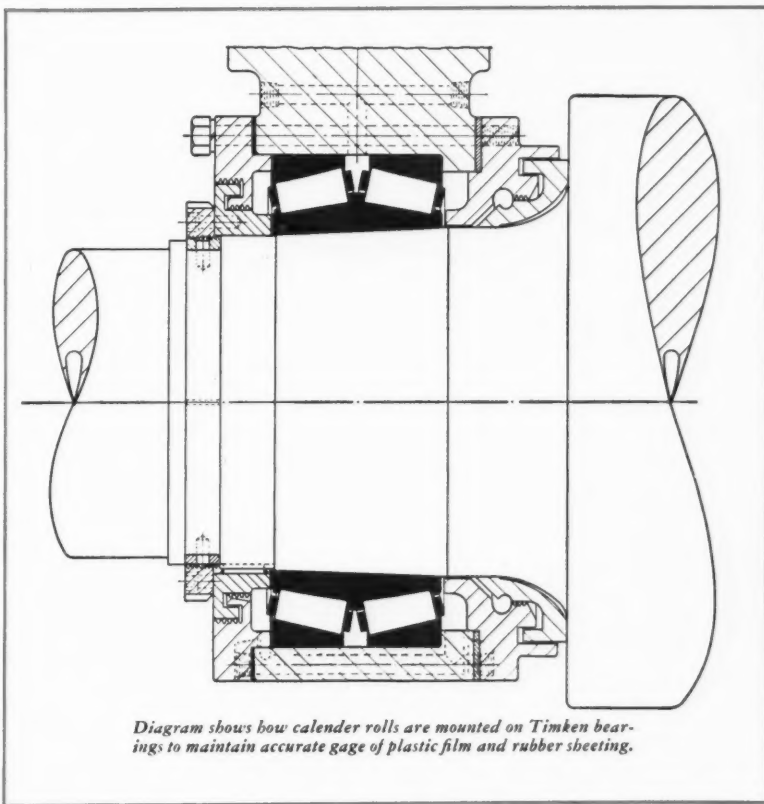


Diagram shows how calender rolls are mounted on Timken bearings to maintain accurate gage of plastic film and rubber sheeting.



TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

NOT JUST A BALL  NOT JUST A ROLLER  THE TIMKEN TAPERED ROLLER  BEARING TAKES RADIAL  AND THRUST  LOADS OR ANY COMBINATION 

March, 1952

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Kleinert Breakfast Host

Kleinert's Notions Breakfast took place the morning of February 5 at the Hotel Statler, New York, N. Y. Given annually by I. B. Kleinert Rubber Co., 485 Fifth Ave., New York 17, in conjunction with the National Notion & Novelty Show, the affair attracted 1,000 merchandise managers and notion buyers. Speakers included Ralph K. Guinzburg, president of the rubber company, who also acted as master of ceremonies; Arthur H. Motley, president of Parade Publications; Richard Bleier, assistant to the president of Kleinert's; and Mrs. Florence Goldin, vice president of Grey Advertising Agency.

Also introduced to the audience were the following Kleinert executives: vice presidents George K. and Roland Guinzburg and Paul R. McCampbell; Secretary Arthur Salinger; Treasurer Charles B. Mergentime; Sales Manager Harold W. Quinby; Assistant Sales Manager M. Goldberg; and district managers Edward J. Kern and Thomas J. Spearing.

Mr. Motley in a provocative and entertaining talk presented many helpful hints on merchandising in general and selling notions in particular.

Mr. Bleier reported on the great success of the Self-Selector, designed by Kleinert for the quick selling of notions. These open slotted attractive cabinets have made for more rapid turnover of merchandise, but not of labor, and for greater profits in the stores where they have been installed.

Mr. Guinzburg discussed the importance of new and better techniques for selling notion items and gave an overall picture of the importance of notion operations to the store as a whole.

Mrs. Goldin was the commentator of the fashion show, "Notion Needs for Spring Fashions," arranged by Gimbel Brothers. Among the Kleinert notions—seen and unseen with the smart spring clothes—were pucker night caps, rubberized back panels for crinoline petticoats, dress shields, shoulder pads, girdles, panties, garter belts, bathing caps, beach bags, stoles, and shoes.

Veteran Worker Honored

Dewitt C. Ogerbaugh with Kleinert 61 years was honored by company directors on February 1 at a luncheon at the Cornell Club, New York. Mr. Ogerbaugh, who started with the firm in March, 1891, at the age of 16, now serves as head of the shipping department at the Kleinert factory in College Point, L. I.

Quaker Advances Two

H. M. Sossaman has been elected vice president in charge of commercial development, Quaker Rubber Corp., division of H. K. Porter Co., Inc., Philadelphia, Pa. Mr. Sossaman, with Quaker more than 23 years, began as a salesman in the Florida district and progressed steadily in the company, having been promoted to assistant general sales manager in 1943 and general sales manager in 1950.

J. R. Lewis succeeds Mr. Sossaman in the latter capacity. Mr. Lewis, who started with Quaker since 1940, has held positions as Philadelphia district sales manager, assistant sales manager, and assistant general sales manager. He now will be in complete charge of the company's sales organization.



View of Unloading Station of Sun Rubber's Automatic Vinyl Casting Machine: Open Molds (Bottom) Are Unloaded (Center) and Move Vertically to Reloading Station

Automatic Vinyl Casting Machine

After more than five years of research and development, Sun Rubber Co., Barberton, O., has unveiled what are said to be the first automatic vinyl casting machines designed for mass-production operation. Incorporating the latest developments in rotational molding, each of these machines is capable of turning out more than 100,000 finished dolls or toys daily. While initially producing a new line of Sunruco vinyl toys and dolls, the machines can easily be adapted to production of a wide range of drug sundries and industrial parts. At present Sun has three casting machines in operation with a total capacity of several million pieces a month.

The machines are completely automatic; the only manual operation is the removal of the finished pieces from the mold, as shown in the accompanying photograph. Each machine has two continuously moving conveyors, to each of which are attached many production molds. The molds are loaded by means of an automatic injector and measuring device which delivers a predetermined charge of vinyl material to each mold. After charging, the injector withdraws automatically, and the mold closes and locks automatically. After locking, the mold goes through a set number of rotations to distribute and gel the vinyl over the inner surfaces of the mold. The mold continues to rotate until after it has passed through a fusing oven, then moves through air cooled chambers until cool. At the end of the cycle the mold emerges from the cooling chambers, automatically unlocks, and opens while in a fixed vertical position for easy unloading by the operator. From this station the mold progresses to the charging point for reloading.

Sun's first experimental pilot machine for automatic casting was designed by Henry Martin, chief engineer, and Paul Rekettye, manager of the machine development department. This rotational vinyl casting equipment is said to have many advantages over both slush molding and

existing rotational molding processes. Unlike slush molding, there is no waste of material or contamination, and the finished product need not have an opening (by which excess vinyl is removed in the slush molding process). Unlike other rotational molding processes, the machine gives uniform distribution of vinyl over all interior surfaces of the mold and permits the casting of all sorts of complex shapes. Operation has been so simplified that it is possible to make a complete change of molds in one cycle without stopping the machine.

Officers Relected

Stockholders held their annual meeting February 6 and relected all directors for another year, including: T. W. Smith, Jr., Samuel C. Andress, Joseph L. McLane, Reed H. Albig, J. Paul Farrell, G. L. Howder, and Sherwin M. Wylie. They in turn relected the company officers, as follows: Mr. Smith, chairman of the board, president, and treasurer; Mr. McLane, Tom B. Roberts, and Wm. R. Lantz, vice presidents; Mr. Andress, secretary; Walter S. Raymer, Jr., assistant secretary-treasurer; and A. Clarke Mack, Jr., assistant to the president.

Tire Sales Campaign

Seiberling Rubber Co., Akron, O., reintroduced its first-quality "Super Service" passenger-car tire. This line now includes a range of low-pressure types. With the "Safety" and "Safe Air" tires, the "Super Service" completes the Seiberling passenger-car tire line.

Seiberling at three one-week January conferences attended by company salesmen from coast to coast announced plans for the competitive 1952 sales year. Key-note is "Action That Sells Now!", a program intended to stress company product quality and safety, according to L. M. Seiberling, vice president in charge of sales, and tire care will again be pushed. New sales tools introduced to salesmen were motion pictures, presentation books, and advertising and merchandising manuals. A national magazine campaign was also outlined by J. A. Fouché, advertising-merchandising manager. Other speakers were Jack Lotze, manager of passenger tire and sealed air tube sales, and G. A. Wiedemer, manager of truck and bus tire sales.

Fremont Dealers Meet

W. C. Gilbertson, vice president in charge of sales, Fremont Rubber Co., Fremont, O., announced that a new vinyl plastic tile and topping, to be introduced to the trade soon, was presented to a group of Fremont distributors at a Distributors' Council meeting, January 28 to 30. The new tile and topping will be available in nine colors.

During the two-day meeting distributors made a tour of the plant and also saw the new Fremont offices now under construction. The new addition represents part of a Fremont 10-year plan expansion program.

The Council held discussions of merchandising and sales, policies, and advertising plans for 1952. All top Fremont executives attended the conference and participated in the discussions.

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Celebrating Our

41st

Anniversary

With over forty years of service to the rubber and allied industries,

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Goodrich Appointments

Lee D. Tidball has been appointed production superintendent of the industrial products manufacturing division of The B. F. Goodrich Co., Akron, O. Tidball was manager of molded goods departments for the last five years. Previously he had been staff superintendent of the division and at Plant 4. Tidball started with the company as an industrial engineer at Miller Rubber Co., which became Plant 4 of B. F. Goodrich in 1929.

Reporting to Tidball are Don Smith, general foreman, molded goods, and the following production managers: Robert E. Baltz, miscellaneous products; Herman E. Resseger, hose; David G. Hunt, belting, matting, and packing. Henry L. Dixon, formerly manager of belting, matting, and packing, has been assigned other duties.

Barry T. Leithead, president of Cluett, Peabody & Co., Inc., has been elected a director of the Goodrich company.

Harold F. Bichsel has been appointed manager of the New York office of the automotive, aviation and government division.

James A. Reed, who held the post for the last nine years and who has been with the company 44 years, has been given a new assignment as special aeronautical sales representative to eastern aircraft manufacturers and other users of aviation products. He will represent James S. Pedler, manager of aeronautical sales in this field.

Bichsel has been with Goodrich for the last 18 years, most recently as a sales representative of his division in the New York area. He also had held a similar post in Washington, D. C., as well as having been division sales promotion manager several years.

J. E. Stenger has been appointed secretary of Goodrich Co. (S.S.) Ltd., the subsidiary of B. F. Goodrich conducting operations in Singapore, Malaya. With the company nearly five years, and in the purchasing department for the last three, Stenger is making his first trip to the Far East. He is a graduate in the 1947 class at the University of Akron. During World War II he was with the 104th infantry division in Europe.

Louis Ramsthaler, manager of technical service in the Goodrich tire division, has been transferred to Bogota, Columbia, where he will be factory manager of Industria Colombiana de Llantas, a rubber company of which International B. F. Goodrich Co. is an associate. Ramsthaler, with Goodrich 23 years, was in the tire development department several years before becoming manager of technical service. In his new post he succeeds Edward Bruner, who has returned to Akron for a new assignment.

Dean E. Carson, director of business research at Goodrich, has been elected chairman of the market research advisory council of the National Industrial Conference Board, New York, N. Y. Carson, with Goodrich since 1920, is a charter member of the advisory council organized in 1945.

William J. Carlin has joined the fatty acid sales staff of W. C. Hardesty Co., Inc., New York, N. Y. Mr. Carlin, who formerly worked for E. F. Drew & Co., will cover the Middle Atlantic States for the Hardesty company.

Dewey & Almy News

Robert T. Haslam has been elected a member of the board of directors of Dewey & Almy Chemical Co., Cambridge, Mass. Mr. Haslam is a former vice president and director of Standard Oil Co. (N. J.) where his responsibilities included direction of research and sales; president of United States Pipe Line Co.; a director and member of the executive committee of Ethyl Corp.; a director of American Gas & Electric Co., W. R. Grace & Co., and Worthington Pump & Machinery Corp.; and a member of the corporation of M. I. T.

Bradley Dewey, president of Dewey & Almy, has been elected a director of W. R. Grace & Co., international industrial and trading concern, New York 4, N. Y.

Charles E. Brookes has been added to the sales staff as part of an expanded program for the production and sales of high styrene copolymer latices and resins, polyvinyl acetate emulsions, plasticizers and dispersing agents by Dewey & Almy's organic chemicals division. Mr. Brookes previously had sold rubber plasticizers and related products for Sun Oil Co.



Charles E. Brookes

T. T. Miller, Dewey & Almy vice president for sales, participated in a panel discussion of "Technological Progress and Its Impact on Marketing" at the February 11 meeting of the American Management Association, at the Hotel Statler, New York, N. Y. Speaking on the chemical field Mr. Miller stated that America's rapidly growing chemical industry is in a significant stage of its development today because of its ability to provide substitutes for the natural products upon which our national survival depends. Not only marketing, but "all industry, all commerce, and all lives" are being affected profoundly by developments in the chemical industry. Mr. Miller cited the fields of petrochemistry, silicones, fluorochemicals, and synthetic rubber as those producing notable results.

Brown Rubber Co., Inc., Lafayette, Ind., in its recent annual report to shareholders revealed that it has tentatively budgeted about \$80,000 for new facilities and physical improvements in 1952.

Making New Auto Tires

Firestone Tire & Rubber Co., Akron, O., last month reported production of two new popular-price auto tires. Already available in most sizes through Firestone dealers and stores, the Champion tires in conventional and low-pressure constructions provide motorists with better tire values and lower prices, according to H. D. Tompkins, company vice president in charge of sales. The seven-rib tread of the Champion Super-Balloon and the eight-rib tread of the standard Champion are made from specially compounded cold rubber. Both tires have flat, wide, and deep treads, and both feature Firestone's Safti-Locked Super Gum-Dipped Cord construction. The Super-Balloon is available in 6.40-15, 6.70-15, 7.10-15, and 7.60-15 sizes; while the conventional Champion is made in 5.50-17, 6.00-16, 6.50-15, 6.50-16, and 7.00-15 sizes.

Personnel Transferred

Clyde S. Gischel has been named manager of tire sales for the company; while Charles E. Erb takes over Mr. Gischel's former duties as manager of passenger tire sales.

Previous manager of tire sales was V. D. Kniss, recently assigned new duties as general merchandising manager, when Earl B. Hathaway was named sales manager of Firestone.

Mr. Gischel started in the Firestone college class for sales trainees and the company's brake and battery school. After being an instructor there he was assigned to the field sales force, where he served in all capacities in company stores. In 1941 he became manager of the Des Moines store; in 1942, district store supervisor with headquarters in Omaha; and in 1943, manager of passenger tire sales.

Mr. Erb from 1932 to 1938 worked for two major automobile manufacturers. Next he served as a budget salesman and a territory salesman in the Buffalo sales district of Firestone. In 1945 he was transferred to the Akron district as truck tire salesman. In 1946 he was made a national account sales representative of the company and in 1947 head of the national account department.

Safety Campaign

Firestone is carrying on an extensive program to promote safety among its manufacturing employees and those in its stores, warehouses, retread shops, and appliance shops, under the slogan, "Safety Is Our Business at Firestone." As one phase of this program, special safety bulletins have been prepared and issued to the workers. The series now consists of nine booklets, and others will be added as needed. Titles are "How to Change Wheels Safely," "Locking Ring Accidents," "How to Avoid Injury from Buffing Wheels," "The Safe Way to Work with Knives," "The Safe Way to Pile Stock," "The Safe Way to Lift," "Lift Tires Safely," "How to Avoid Falling," and "What to Do in Case of Accident."

Vincent Arch has been appointed works manager of Vulcanized Rubber & Plastics Co., Morrisville, Pa. He has been with the company nearly 25 years, working up from the ranks. For a number of years Mr. Arch was rubber superintendent and for the past six months, assistant works manager.

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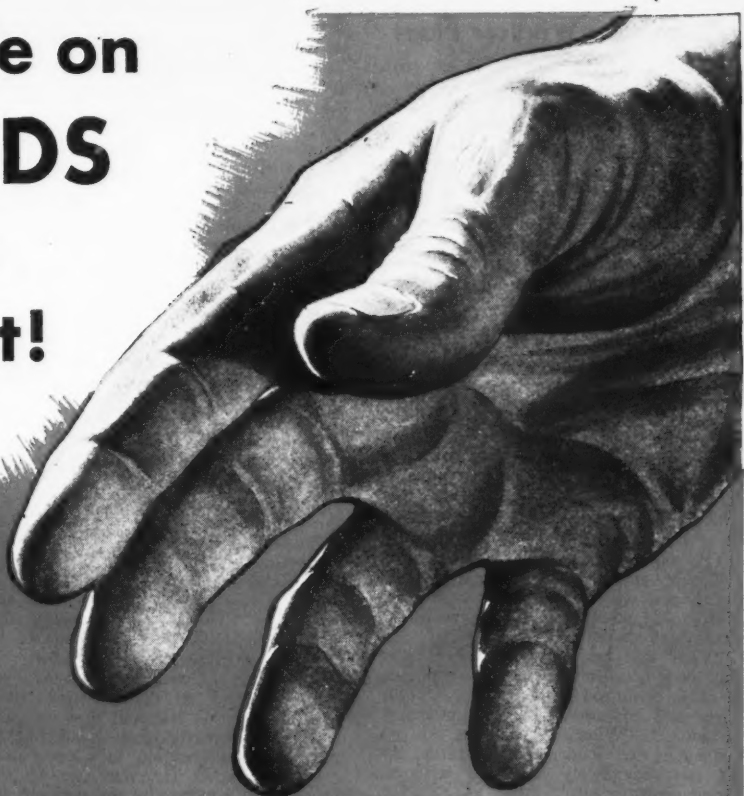
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Don't gamble on
FATTY ACIDS
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To be sure of reliable quality
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... SPECIFY EMERY FATTY ACIDS!



For more than a century, Emery has been first to develop new production methods and analytical controls that assure absolute uniformity and reliability in each and every shipment. You can also look to Emery's continuing research and development to bring you the *finest* in fatty acids *first*.

Whether you need a high quality, high stability Stearic or Oleic Acid, a Vegetable Fatty Acid, a Hydrogenated Animal or Fish Fatty Acid or Glyceride—there is a type and quality to meet your exact specifications and price needs.

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187 Perry St., Lowell, Mass.
221 N. La Salle St., Chicago 1, Ill.
420 Market St., San Francisco 11, Calif.
Export: 5035 RCA Bldg., New York 20, N.Y.

Warehouse stocks also in
St. Louis, Buffalo, Baltimore
and Los Angeles

Representatives:
Schibley & Ossmann, Inc., 33 Public
Square, Cleveland 13, Ohio
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Expanding Windsor Plant

Announcement of a \$750,000 expansion program for the Windsor, Vt., plant of the Goodyear Tire & Rubber Co., Akron, O., has been made by F. R. Evans, production manager of the company's shoe products division.

Evans reported also that the Windsor plant's name has been changed from Windsor Mfg. Corp. to The Goodyear Tire & Rubber Co. of Vermont, Shoe Products Division.

When final arrangements are made with contractors, work will begin on a new building of 66,000 square feet of floor space, to be used for finished goods, warehousing, and shipping. Space opened up in present plant buildings, by addition of the new facility, will be taken up by new equipment.

Increased demands for Goodyear's Neolite product, used as a fabricating material in the shoe, luggage, men's and women's furnishings and accessories, and novelties trades, were credited for the expansion of production facilities.

The expansion, including installation of machinery still in the design and engineering stages, will be spread over a period of 18 to 24 months and will have no immediate effect on employment.

Evans said the change in plant name was made because the former name tended to cause confusion among the plant's suppliers and consumers. Before the change in name the Windsor plant was the only factory in the Goodyear organization that was not completely identified with the parent company.

Goodyear Personnel Notes

Alan G. Buckley has been appointed assistant manager of construction engineering, with headquarters in Akron, where he will engage in engineering work for all Goodyear plants. Buckley has just returned from Luxembourg, where he has been since 1949 in charge of engineering for Goodyear's newest plant, which is now producing tires for the Benelux nations.

After attending Akron University, Buckley joined Goodyear as a squadron member in 1931. Later he was assigned to the construction engineering department. In 1934, Buckley went to Java to participate in building and installing equipment in the Goodyear plant there. He remained at the Java plant as chief engineer. When the island was threatened with invasion in 1942, Buckley returned to Akron, but after six months was assigned to the plant in Sao Paulo, Brazil. Buckley made a trip in 1946, after the war ended, to Java to inspect the Goodyear plant. He then moved on to Singapore, where he was placed in charge of installing a latex creaming plant at Rengam in the Straits Settlements. Returning to Akron in 1947, Buckley coordinated engineering work for installation of Air-foam and Phiofilm production at Plant C.

Paul A. Metz, Jr., has been made chief chemist of Goodyear's New Bedford, Mass. plant, reporting to Samuel Borodkin, technical superintendent there. Mr. Metz joined Goodyear at Akron as a trainee in 1943, moving into rubber compounding a year later. He was assigned to duties at New Bedford as a compounder in May, 1951.

D. W. Critchfield has been appointed manager of aviation products for the western division of the Goodyear company. Prior to this assignment Critchfield had

served as district manager of the aviation products division in New York, where he has been replaced by E. M. Humphrey, formerly coordinator of airline sales in Akron.

K. J. Kernochan continues in the Los Angeles district and will handle western division distributor sales.

Critchfield started with Goodyear in sales training in 1926 at Akron. Shortly after, he was assigned to inside sales at Omaha; in 1929 returned to Akron in the auto tire department; subsequently served in Detroit as truck tire and general-line salesman and in Grand Rapids and Chicago as a truck tire salesman. Critchfield was made special car dealer salesman in Minneapolis in 1941 and later that year was transferred to New York as aviation products sales representative, to become district manager there in 1942.

Humphrey joined Goodyear at Newark, N. J., in 1938, and was transferred to Akron as general office staff trainee in 1940. He next served with the Army Air Force and following his discharge from military service in 1946 was assigned to Goodyear's aviation products division as senior staffman. Later that year he was named airline contact engineer with headquarters in New York; returned to Akron in that capacity in 1948; and in 1951 was made airline sales coordinator.

R. S. Wilson, vice president of Goodyear, received a distinguished service award from the National Association of Soil Conservation Districts during the group's annual meeting in Cleveland, O., February 25-29. He was one of three businessmen honored by the national farm organization "because they have taken time out from their exacting schedules to sit down with conservation farmers and lend their personal support to a program for the betterment of agriculture."

Recent Product Developments

A washable plastic air filter for forced draft hot-air furnaces and air conditioning systems has been developed by Goodyear. Capable of catching pollen from the air and even the most minute solids in cigarette smoke, the filter is described as a self-charging electrostatic unit which takes advantage of the dielectric properties of certain plastic films, resins, and waxes. According to Ward T. Van Orman, of Goodyear's research laboratory, the material used in the filter is a thin polyethylene film shredded into a porous mass. When exposed in a current of air, this mass picks up an electrostatic charge which attracts and retains the finest of dust, soot, or smoke particles which may be suspended in the air. The filter can be cleaned easily by rinsing in cold water, with no detergent required. After rinsing, the filter can be drained for several minutes and restored to service while still damp. The filter can be cleaned over and over again without loss of performance. Goodyear is already in limited production of the filters, and the future rate of production will depend on the availability of metal for the filter frames.

A rubber-cushioned fender cover, for use by auto mechanics to protect the finish of cars being repaired or serviced, is being produced by Industrial Covers Co., Akron. The cover consists of a greaseproof vinyl film laminated to a thin cushion of Air-foam, both produced by Goodyear. The new product is being marketed in two sizes, 27 by 36 inches and 33 by 54 inches.

After a long-range program begun nearly five years ago and conducted by Goodyear in cooperation with independent paint

manufacturers, paints made with Pliolite S-5 are proving to be outstanding for exterior stucco and masonry. Ordinary paints are not satisfactory for resisting attack by the alkali present in new stucco and masonry; while cement coatings stain easily and are difficult to repaint. In contrast, paints made with Pliolite S-5 have resisted alkali even in raw stucco, are practically non-staining, remain white and attractive, and are easy to repaint, it is reported. On the basis of these tests, many paint manufacturers throughout the country have started production of Pliolite S-5 exterior stucco and masonry paints. Produced in pastels and deep tone colors, as well as white, these paints are expected to be available to most consumers by spring.

Firestone Plastics

Firestone Plastics Co., Pottstown, Pa., has introduced several innovations in plastics film for the inflatables field through Plastictronics, Inc., New York, N. Y., manufacturer of the Holiday Line of inflatables. Fabric-like textures are the most important development in Velon inflatable film, with new embossings to give the weave, depth, and pattern of a true fabric. Geometric designs were chosen by Firestone for the first films, but other designs will be added to the line. The film comes in a wide variety of colors selected for purchaser appeal. The second improvement is achieved by Firestone in its production process which employs an exclusive fusion technique rather than a straight lamination to give a film completely free from pinholes and other defects. Plastictronics' Holiday Line features Velon film in a variety of products, including beach balls, wading pools, surf riders, bathtub boats, portable baby baths, camp mattresses, back rests and beach novelties. Extensive consumer promotions are planned to introduce the Velon textures and other features of the line, which include self-selling packages and unusual prints.

Charles F. Edelmann is now eastern sales representative of the Velon film division, with headquarters at 350 Fifth Ave., New York 1. Mr. Edelmann was formerly sales assistant to the president of Harte & Co. and had previous sales experience with Toscony Fabrics and Ververay Corp.

Cabot Appointments

Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10, Mass., has appointed Henry L. Grund Co., 406 Bulkley Bldg., Cleveland, O., exclusive agent for the sale of Cabot carbon blacks to the paint, ink, plastics, and related industries in the Cleveland and northern Ohio area.

William J. McNeil, a graduate of Worcester Polytechnic Institute, has joined Cabot's research and development department as a chemical engineer in the pigments applications group.

Cabot on February 7 elected to its board of directors Louis Cabot, grandson of the company's founder; David D. Cochran, vice president; and Owen J. Brown, Jr., vice president and general sales manager.

George H. Cash was elected managing director of Cabot Carbon, Ltd., subsidiary at Ellesmere Port, near Liverpool, England, at the February meeting of its board.

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Personnel Promoted

In a series of promotional moves in the plastic materials sales department, George E. Field has been named field sales manager; Phillip J. Weaver, technical service manager; Robert F. Dettelbach, eastern sales manager; and Clyde D. Segner takes on increased responsibilities as technical staff representative, according to G. A. Fowles, sales manager of plastics materials, B. F. Goodrich Chemical Co., 324 Rose Bldg., Cleveland 15, O.

Field came from the heavy chemical manufacturing industry to The B. F. Goodrich Co. in 1942 as production manager and later plant manager of the GR-S American rubber plant operated for the government by BFG in Louisville Ky. He was transferred to Cleveland in January, 1947, as technical manager and coordinator of all GR-S plants operated by Goodrich Chemical. Field served on the Rubber Reserve Operating Committee and the Sub-committees on Process Improvement, Plant Revisions, and Test Methods. Late in 1947 he joined the Geon plastics technical service organization and became technical service manager the following year. He is a member of the American Chemical Society, American Institute of Chemical Engineers, Society of Plastics Engineers, Society of the Plastics Industry, and the Technical Association of the Pulp & Paper Industry.

Weaver joined Goodrich in Akron as a chemist in 1943. In 1944 he worked with the vinyl plastic research group and with the formation of Goodrich Chemical in 1945 was made a development supervisor in the sales service laboratory. He was appointed a technical service engineer in 1951.

As eastern sales manager for plastic materials, Dettelbach will have charge of sales offices in Boston and New York. He started with Goodrich in 1944 as a technical service engineer in Akron, moved to the Chemical company in 1945, and was made a sales representative in the New York area. Dettelbach is a member of the SPI and the Chemists Club of New York.

Segner, who will be responsible for Good-rite plasticizer sales and technical service in addition to special technical service projects, has been with BFG since 1937. After serving as a chemist in the general laboratories in Akron, in 1939 he became a member of the research group on polyvinyl chloride plastic. In 1941 he moved to technical sales, and was made a technical staff representative with Goodrich Chemical in 1951. Segner belongs to the SPE, SPI, and A. C. S.

Owing to expanding business Goodrich Chemical has moved its sales offices on the Pacific Coast to Suite 301, 714 W. Olympic Blvd., Los Angeles 15, Calif. R. E. Bitter and T. A. Hoyle, Pacific Coast sales representatives of the company, will make their headquarters there.

New York Quartermaster Procurement Agency, 111 E. 16th St., New York 3, N. Y., recently announced awarding of the following contracts for: *rubber insulated combat boots* Endicott Johnson Corp., Endicott, N. Y., and Rubber Corp. of California, Garden Grove, Calif., each order for 5,000 pairs, value, \$125,000; *rubber bands*, Red Raven Rubber Co., Newark, N. J., 116,500 boxes, \$24,162.10, and Servbest Co., New York, 50,000 boxes, \$10,495.

G-E Developments

General Electric Co., chemical division, Pittsfield, Mass., has announced a development which permits the utilization of domestic mica for a variety of electric insulating application, and it may free the domestic mica industry from dependence on foreign sources. Key to the development is a special process by which minute mica flakes are so treated that a force is generated which holds the particles together, according to Robert L. Gibson, division general manager. The resultant product is a continuous sheet produced in thicknesses ranging from 0.002-0.006-inch and having a better dielectric strength than present machine or hand laid mica products. Named G-E micamat, the new product is currently being pilot-planted, and commercial production is planned later this year. Capable of being impregnated with resins and bonded to paper, glass, or cloth for greater strength, G-E micamat tapes and sheets can be used in heating devices, molded into shapes for motors and generators, or machine wrapped on bars and cable.

Impellers for G-E automatic dishwashers are now being molded of rubber-phenolic compound made by the company's chemical division. With conventional flock-filled phenolic compounds formerly used, some breakage occurred when silverware was accidentally dropped on the impeller. This breakage has been reduced substantially with the use of G-E 12494 rubber-phenolic compound which withstands at least five times the impact load of the material formerly used.

Changes in Personnel

Edwin M. Irish, Jr., of the chemical division, having been appointed phenolic products sales manager of the division's chemical materials department, will have sales responsibility for phenolic molding compounds, laminating resins, and industrial resins. After four years as a research chemist with Magnolia Petroleum Co., Mr. Irish in 1944 joined G-E at Pittsfield as a development engineer on silicone rubber and in 1947 was made sales specialist on the product. In 1949 he became New England sales representative on phenolic products. He is a member of the American Chemical Society and the Society of Plastics Engineers.

William L. Rodich has been promoted to general manager of the laminated and insulating products department of the chemical division, with headquarters in Coshocton, O., to succeed Harry K. Collins, resigned. With G-E since 1950, Mr. Rodich has served as manufacturing manager of the chemical materials department and then as assistant general manager of the laminated and insulating products department.

Victory Plastics & Embossing Corp., 340 Bond St., Brooklyn, N. Y., has opened a new sales office at 172 Madison Ave., New York, N. Y., to serve as headquarters for the firms new sales force in the eastern territory which takes over the area formerly handled by The McCordi Corp. for sales of Vinylite plastic film and sheeting embossed, printed, and laminated by Victory. Also at the New York office is Carl Frye, recently appointed sales promotion manager, who has had 17 years' experience in the plastic film and sheeting and allied coated textile fields.

Notions Show

The seventeenth National Notion & Novelty Show, held February 4-8 at the Hotel New Yorker, New York, N. Y., showed new trends and adaptations for many rubber and plastics articles.

Items exhibited in the show included: dress shields; aprons; beach, travel, closet, and bathroom accessories; rainwear; footwear; plastic yard goods and packaging materials; crib sheets; waterproof sheeting; panties; storage, refrigerator, diaper, and shopping bags; girdles, garter belts, and sanitary goods; table, lampshade, and furniture covers; clothespins; combs; knitting boxes and sewing cases; shoe shine applicator and buffer; trays; suspenders and garters; elastic goods; make-up capes; shoulder pads; glove driers; tie racks; bibs; mats; hose; rubber bands; tapes; toys; tablecloths; cushions.

Among firms taking part in the show were: Seal Sac, Inc.; Anchorchief Co., Inc.; Coffey-Hoyt Products, Inc.; Peek-A-Boot, Inc.; Chenille Tuffies; A & E Mfg. Co.; A. L. Siegel Co., Inc.; Venus Corp.; Beyerle Mfg. Co., Inc.; Dralar of California; Van-Sen, Inc.; A. H. Bailey Footwear, Inc.; Henry Hanger Co. of America; Prepac, Inc.; Mercury Plastics; Gibraltar Household Products Co., Inc.; Gem Rubber Corp.; Protex Products Co., Inc.; Freeman Mfg. Co.; Marshall Industries; Sydney-Thomas Corp.; Triangle Mfg. Co., Inc.; Weiss & Klau Co.; Plymouth Rubber Co., Inc.; Vivitex Corp.; Equality Plastics, Inc.; National Plastikwear, Inc.; Lucky Plastic Co., Inc.; Princess Plastic Products, Inc.; Philadelphia Corset Supply Co.; Texicote, Inc.; Alta Products Corp.; Saulbert, Inc.; Elfay Mfg. Co.; L. Mayer Co.; Tetfoam Corp.; S & F Co.; Lovalon Foundations; Harber Products, Inc.; Stuart M. Lerner, Inc.; Gerry Nufoam Products Corp.; Elrene Mfg. Co.; Central States Paper & Bag Co.; E. R. Carpenter Co.; Advance Mfg. Co., Inc.; National Puff Co.; Ned F. Harbin Co.; Blossom Mfg. Co.; Harn Mfg. Co.; Sunwear; Certified Fabrics Co.; Swell-Wear, Inc.; Mercantile Plastics Co., Inc.; Pad Abouts, Inc.; P. & R. Products Co.; Beautis Foundation Mfg. Corp.; Carisart, Inc.; Master Plastic Molding Corp.; Sturm & Scheinberg, Inc.; Sidmar Associates, Inc.

American Agile Corp., fabricator of Agilene and Agilide products, according to C. F. Freedman, vice president in charge of sales, has completed a new 12,500-square-foot building at 5461 Dunham Rd., Maple Heights, O. (Mailing address, P. O. Box 168, Bedford, O.) The expanded production facilities permit the manufacture of a complete range of standard and custom-built corrosion resistant bottles, containers, tanks and tank liners, pipe lines, equipment, and apparatus in polyethylene, hard polyvinyl chloride, and other thermoplastic and thermosetting materials for the chemical and allied industries.

Dunnican Associates, 352 Plymouth Rd., Union, N. J., has been appointed sales representatives by Gordon Chemical Co., Wilmington, Del., for the sale of "Uramol" urea molding materials in New Jersey and New England. Dunnican will continue to represent Synvar Corp., Wilmington, in the sale of its phenolic molding materials and industrial synthetic resins.

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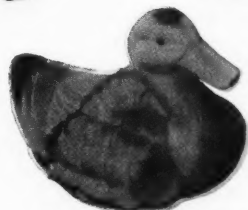
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PLASTICS • INDUSTRIAL FINISHES • CHEMICALS

Name New Officers

The Rubber Heel & Sole Institute and Elastic Colloid Research Corp., both of 551 Fifth Ave., New York, N. Y., held their annual meetings on January 25 and elected the following officers and directors for 1952.

The Institute: president, Wm. P. Harty, Avon Sole Co., Avon, Mass.; vice president, R. M. Hoffman, Victor Products Corp., Gettysburg, Pa.; secretary, Robert A. Winters; treasurer, M. J. Bernstein, American Bilrite Rubber Co., Chelsea, Mass.; directors, (one year), Mr. Hoffman, (two years), Kyle L. Menuez, Gro-Cord Rubber Co., Lima, O., (three years) P. J. Fineman, Cat's Paw Rubber Co., Baltimore, Md.

Elastic Colloid: president, David W. Bernstein, American Bilrite; vice president, I. B. Calvin, Bearfoot Sole Co., Wadsworth, O.; Secretary, S. F. Butman, Lynch Heel Co., Chelsea; treasurer, Forest Moor, Gro-Cord; assistant treasurer, E. Colman Beebe, Beebe Rubber Co., Nashua, N. H.; general manager, Mr. Winters; directors, (one year), Mr. Moor and D. Bernstein, (two years), S. D. Haines, Bradstone Rubber Co., Woodbine, N. J., and Mr. Beebe, (three years), Messrs. Calvin and Butman.

Shawray Plastics Corp., 398 Broadway, New York, N. Y., has been appointed a converter and distributor of Vinylfilm. Recently reorganized, Shawray is headed by President Edward Shaw and Vice President and Secretary Arthur Blumenthal, previously vice president of Plastron, Inc. The new company will offer Vinylfilm printed in one to four colors by the rotogravure process, and surface prints in as many as 12 colors, both in widths up to 54 inches. The company will also offer molded and embossed films, laminated materials, and electronically seamed quilting. Shawray will market its product under the trade name of Colorbrite plastic fabrics.

Endura Mfg. Corp., Quakertown, Pa., at the recent directors' annual meeting elected Philip A. Lamp, president, succeeding C. A. G. Pease, who held that post since organization of the company in 1929. Mr. Pease was elected board chairman. Mr. Lamp joined the company in 1944 and became executive vice president and treasurer in 1949. Other officers elected for the current year were C. W. Miller, vice president; W. S. Achey, secretary; and M. A. Shelly, assistant treasurer. Endura manufactures latex and glue-glycerine impregnated papers for artificial leather, shoe materials, tape backings, gaskets, and sheet packing.

Pratt & Whitney, West Hartford, Conn., has relocated its Pittsburgh office to 683 Lincoln Ave., Pittsburgh 2, Pa. Additional space at this new building permits a more comprehensive stock and gives adequate office area for the factory-trained sales and service personnel associated with the machine tools, cutting tools and gages produced by Pratt & Whitney and its subsidiary, Potter & Johnston Co., Pawtucket, R. I. The office is under the management of W. W. Stoner, Jr., district manager. The staff includes E. J. Stokes, machinery sales engineer; J. C. Williams, cutting tools and gage sales engineer; J. R. Cooper, gage sales engineer; and J. E. Hecht, office sales, cutting tools and gages.

Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14, O., has transferred L. J. Polite, Jr., long active in chlorinated solvents sales to the organic chemicals division. He will be attached to the sales staff of Kolker Chemical Works, Inc., Newark, N. J., a Diamond subsidiary specializing in organic chemicals for industry and agriculture. Mr. Polite joined Diamond after his graduation from Williams College. During World War II he served in the U. S. Navy.

Diamond's sales and service to chlorinated solvents customers will continue under the direction of C. M. Holt, product sales manager for chlorine and its derivatives.

Electronic Rubber Co., Stamford, Conn., is expanding its facilities to include the manufacture of polyvinyl chloride injection molding and extrusion compounds for non-electrical uses. The company pioneered in the development of high-temperature vinyl compounds for wire insulation, using a compound based on a Marvinal VR-10 formulation produced by Naugatuck Chemical Division, United States Rubber Co. In the non-electrical field Electronic Rubber is evaluating a new rigid compound for household applications, and several new compounds for use in the manufacture of dolls, shoe welting, beverage tubing, belting, and other applications.

Interchemical Corp., Newark, N. J., has appointed Ralph R. Browning, Jr., to the staff of C. M. Robbins, head of the vinyl plastics department. Mr. Browning will concentrate on the technical promotion of plastisols, plastigels, finishes for elastomeric leather, and other new products in the flexible plastics field. Mr. Browning started as a technical sales representative with Bakelite; during World War II he served as naval liaison officer with the WPP plastics division and next for two years was New England district sales manager of Plastic Manufacturers, Inc. In 1948 he came to Interchemical to head up the technical sales of industrial vinyls for the coated products division. Mr. Browning will headquarter at Interchemical's New York offices at 67 W. 44th St.

Anchor Plastics Co., Inc., 533 Canal St., New York 13, N. Y., is extruding a cellulose acetate butyrate shape used in the Abco weatherstripping developed by Abbott Glass Co., New York. An extruded rubber strip is inserted into a flange of the plastic shape which is designed to fit Abbott's tempered herculite glass doors. Easy to fit or remove from doors, the weatherstripping is said to eliminate drafts, dusts, and air noises from passing through abutting glass doors. Results of test installations indicate that the rubber-plastic weatherstripping is effective for both single- and double-action glass doors used in restaurants, night clubs, theaters, hospitals, showrooms, beauty salons, apartment buildings, and hotels.

Norman S. Mount, advertising and technical sales manager of Ohio-Apex, Inc., Nitro, W. Va., has been appointed to the National Production Administration, Washington, D. C. Mount, with the Nitro company since 1943, is on loan from Ohio-Apex to the Coal Tar Chemicals, Dyes & Intermediates Branch of NPA's Chemical Section as a commodity specialist.

WEST

Monsanto Advances Several

Eight members of the organic chemicals division, Monsanto Chemical Co., St. Louis, Mo., last month received new assignments, according to Howard K. Nason, divisional research director.

George W. Steahly, group leader in the division's laboratories at St. Louis, has been named assistant director of research at the company's laboratories in Nitro, W. Va.

Monte C. Throdahl, assistant research director at Nitro, remains there as manager of the rubber chemicals section in the development department of the division.

One of three newly appointed group leaders in the division's research department is Phillip P. Wallace, in charge of greenhouse activities at St. Louis.

Lloyd E. Weeks has also been appointed a group leader. Stationed at the central research department in Dayton, O., his group will be responsible for certain phases of application research on Kriklum soil conditioner.

The third new group leader is Wm. D. Robinson, now in Steahly's job.

Paul M. Downey, group leader at Nitro, assumes additional responsibility for the Nitro rubber-application laboratory and will also help coordinate research, development, and sales activities for rubber chemicals.

Other additions to the St. Louis laboratories of the organic research department are John C. Kleyn and Harry G. Hurst, both of whom were formerly members of the organic chemicals division development department. They will continue in the microbiological laboratory.

Steahly joined Monsanto in 1941 as a research chemist and became a group leader in 1951. In his new position he will be concerned with all activities of the Nitro research section.

Throdahl has been with Monsanto since 1941, when he started at Nitro as an analytical chemist. He has since held the positions of research chemist, group leader, research supervisor, and assistant director of research. Throdahl's primary concern has been, and will continue to be, with rubber chemicals. Development of new products in that field will be his chief responsibility as manager of the rubber chemical section.

Wallace started in 1946 as a member of the development department of the organic chemicals division.

Weeks has been with the Dayton laboratories since 1946.

Robinson became associated with the company in 1946 and since then has been a researcher in the division's St. Louis laboratories.

Downey joined Monsanto at Nitro in 1938 and since 1950 has been a group leader.

Kleyn has been with the company since 1951 as a microbiologist.

Hurst began with Monsanto at Dayton in 1950 and was transferred to St. Louis the following year.

Commercial Rubber Co. recently announced an addition of 6,700 square feet of office and finished goods storage in a new building at 1659 E. 23rd St., Los Angeles, Calif.

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They come in grades of various melting points and colors.

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R-47

Promotions at 3M

Promotion of six key executives of Minnesota Mining & Mfg. Co., St. Paul, Minn., was announced February 6.

Louis F. Weyand, a vice president and member of the board, was made executive vice president.

Robert W. Young, president of Minnesota Mining & Mfg. International Co., a wholly owned subsidiary handling foreign trade, was named chairman of that organization's board.

Clarence B. Sampair, vice president of 3M International, succeeds Young as president. Sampair also retains his post as a president of the parent company.

Vice President John A. Borden, general manager of the cellophane tape division, was appointed sales and marketing consultant for all 3M tapes.

The board also elected George W. Swenson and Hubert J. Tierney vice presidents of the parent company.

Weyand, a veteran of 37 years' service with 3M was vice president in charge of the adhesives and coatings division since 1946 and was elected to the board of directors in 1950. He will head a new tape group coordinating operations of the firm's tape divisions.

Borden's career with 3M began in 1925. After heading the statistical department for a short time, he became assistant to the president, but in 1929 was made sales manager of masking tape. A year later he took charge of the cellophane tape sales. He was named general manager of the cellophane tape division in 1941 and was elected a vice president in 1948.

Tierney will head manufacturing and product research and development for the new group. After joining 3M in 1927, he took a leave in 1928 to complete his chemical engineering degree at the University of Minnesota. He returned to the company in 1930 as a research chemist and became tape products manager in 1943. Since 1949 he was manufacturing manager heading tape manufacturing and research.

Swenson started as a research chemist in 1928. When the company became interested in roofing granules in 1931, he was assigned the job of developing a permanent color coating process. In 1942 he was placed in charge of the division's factory administration, became production manager in 1946 and general manager in 1949. He will continue to manage the division as vice president.

Sampair's 24 years with the company have been devoted principally to production assignments. He became production manager for all 3M products in 1940 and was named vice president in charge of production in 1946. Since 1949 he has also headed the firm's labor relations group. Like Young he became an officer of 3M International when the subsidiary was established last year.

Although Young's direct association with 3M has been relatively brief, he spent nearly a quarter century with Durex companies through which 3M formerly handled its foreign business. Young became president of Durex in 1931. He was board chairman from 1948 until Durex was dissolved in 1950.

Minnesota Mining & Mfg., now observing its fiftieth anniversary, began operations as an abrasive minerals mining company on the shores of Lake Superior in northern Minnesota. The company now manufactures more than 1,000 diversified products. Besides tapes and roofing granules the firm makes coated abrasives, reflective sheeting, sealants, adhesives, lithographic plates, and chemicals.

Narmco, Inc., Costa Mesa, Calif., has announced a general expansion of its research facilities. The company has a plant and general offices at 600 Victoria St., Costa Mesa, and also operates another factory and a research laboratory in San Diego. The Costa Mesa plant specializes in the impregnating and coating of glass, nylon, cotton, and other fabrics with plastic, resin, and elastomer compositions. Products include Conolon resin impregnated glass fabric fishing rods, rigid ducting, laminates, and others. Aircraft components are made in the San Diego factory and include cellular or honeycomb structures such as table tops, flooring, doors, window frames, partitions, bulkheads, and instrument panels. A variety of Metlbond adhesives and Narmtape adhesive tapes is also made at Costa Mesa.

Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill., has established a products development laboratory, in Detroit, Mich., as a separate division entrusted with responsibility for carrying both defense and civilian items from the invention stage to actual production, under the direction of David T. Sickelsteel, newly appointed general manager of the laboratory and previously vice president in charge of engineering with the Detroit gear division of Borg-Warner.

Attar Sponge Rubber Co., 806 E. 61st St., Los Angeles 1, Calif., has added 1,600 square feet of floor space for manufacturing facilities.

Baldwin-Lima-Hamilton Corp., Philadelphia, Pa., has installed four presses in the Anderson, Calif., plant of United States Plywood Corp. These hydraulic presses, using superheated water as the heating medium, are to be used in the manufacture of Novoply, a laminated wood panel. Two presses, of 873- and 1,820-ton capacity, will be supplied with pre-pressed material by 350- and 775-ton presses, respectively, to form two production lines making boards of different thickness. The 873- and 1,820-ton presses have 16 openings, and platens polished to a parallelism of within 0.003-inch. Each platen surface transmits 70,000 Btu. per hour to the wood panel from the water supplied at 200 psi. pressure and 305° F. The 1,820-ton press has eight cylinders, and the stresses are so balanced that the top 82-by-149-inch platen has a maximum deflection of only 0.004-inch.

CANADA

Rubber Stocks Up, Use Low

Combined stocks of rubber in Canada—natural, synthetic, and reclaim—at the end of December advanced to 11,810 tons from 8,191 a year earlier; while consumption dropped to 6,452 tons from 8,056, the Bureau of Statistics reports. Domestic production of synthetic and reclaim rose to 6,478 tons from 5,692.

Month-end stocks of natural rubber totaled, 4,421 tons, against 3,421 a year

earlier; synthetic, 5,085 tons, against 3,015; and reclaim, 2,304 tons, against 1,755. Consumption of natural rubber amounted to 2,940 tons, compared with 4,506; synthetic, 2,488 tons, against 2,169; and reclaim, 1,024 tons against 1,381. Domestic production of synthetic was 6,140 tons against 5,243, and reclaim 338 tons against 449.

Holds Annual Meeting

The Rubber Association of Canada, Toronto, Ont., on February 23 held its annual meeting at which the following officers were elected for 1952: president, C. C. Thackray, president, Dominion Rubber Co., Ltd.; vice president, R. C. Berkinshaw, president, Goodyear Tire & Rubber Co. of Canada, Ltd.; treasurer, J. R. Belton, vice president, Gutta Percha & Rubber, Ltd.; directors, J. I. Simpson, president Dunlop Tire & Rubber Goods Co., Ltd., W. H. Funston, president, Firestone Tire & Rubber Co. of Canada, Ltd., I. G. Needles, president, B. F. Goodrich Co. of Canada, Ltd., W. H. Miner, president, Miner Rubber Co., Ltd., M. L. Brown, president, Seiberling Rubber Co. of Canada, Ltd., and J. D. Morgan, general manager, Viceroy Mfg. Co., Ltd.

The harmful effect of severe taxation and credit restrictions on the rubber industry during the second half of 1951 was emphasized by President Thackray, who also referred to the decreased volume of sales of tires and tubes.

Greig Smith, the Association's secretary and manager, urged revocation of Canada's trade agreement with Czechoslovakia as a means of curbing the dumping of rubber footwear on the Canadian market. Two other cases of dumping, involving bicycle tubes from Norway and Germany, were acted upon by customs authorities at Ottawa after the Association had substantiated them, Smith further declared.

Mr. Smith also reported that exports of Canadian rubber products in 1951 totaled \$29,067,000, as compared with \$12,153,000 in 1950. While rising costs were partially responsible for the increase, sale volumes doubled or trebled in some lines of products. Although Canada's principal markets were spread throughout the world, the United Kingdom continued the chief buyer of waterproof and canvas footwear, and South Africa remained the major market for rubber clothing in 1951.

Canadian imports of rubber and rubber products reached a new peak of \$19,834,000 in 1951, an increase of 36.4% over the 1950 level. The average invoice value of all grades of crude rubber imported into Canada during the year was 55.8¢ a pound, against 29.2¢ in 1950.

Domestic sales of Canadian tires during 1951 totaled 4,610,868 units, 10% below the 1950 figure. Total sales of footwear at 11,309,073 pairs of waterproof and 3,345,838 pairs of canvas showed little change from 1950 totals. Increased sales of rubber sheet packing, transmission and conveyor belting, and industrial hose made the mechanical goods division one of the brighter spots in the industry's 1951 picture, Mr. Smith added.

Canadian Lastex, Ltd., Montreal, P. Q., in which Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., holds a 50% interest, recently reported that sales and earnings last year dropped from the record levels of 1950 because of the reduced activity of the clothing and textile industry.

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WORLD

March, 1952



**THIS *free* BULLETIN
TELLS A VALUABLE STORY
*write for it today!***

Compounders of mechanical goods, footwear, soles and heels, and sundries will find this Columbia-Southern Pigment Data Bulletin of especial value.

It outlines typical recipes for Silene EF—Calcene TM combinations that can be used as starting points for better rubber stocks at reduced cost.

The bulletin further shows actual properties that can be obtained by these combinations and compares them with more costly reinforcing agents. Good elongation and tear resistance, for example, are definitely imparted through the use of Silene EF and Calcene TM in combination.

Silene EF gives exceptionally good properties when used with ground whiting. However, considerable improvement can be obtained by replacing the ground whiting with Calcene TM.

Another important factor to consider is the low specific gravity of Silene EF which is 2.1. Consequently the volume cost of Silene EF proves quite low in addition to imparting better properties.

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753

Goodyear Elections

R. C. Berkinshaw, vice president and general manager of Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., at the annual meeting on February 21 was elected president of the company to succeed A. G. Partridge, now vice chairman of the board. A. W. Denny was elected vice president and general manager.

Board Chairman Paul W. Litchfield in the annual report stated that financing for an estimated \$5,000,000 expansion program has been arranged and that part of the program, new factory buildings on the New Toronto property, has been started.

Mr. Berkinshaw joined the company after World War I and since 1931 has served successively as assistant to the president, general manager and treasurer, and vice president and general manager.

Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., has placed on the market a new issue of \$3,000,000 5% sinking fund debentures to mature February 1, 1972. The offering price is \$98.50, and interest 5.12%. The issue also carries a sinking fund, commencing in 1955 sufficient to retire all debentures by maturity date. The company is engaged in a program of expanding and improving its manufacturing facilities; part of the necessary funds for which have already been provided from the company's own resources. The purpose of the new issue is to provide funds for general corporate purposes of the company, including the furtherance of its expansion program.

Bakelite Co., (Canada), Ltd., has announced that construction is now under way on a new plant at Belleville, Ont., for the production of formaldehyde. According to Vice President W. M. Davidson, Standard Chemical Co., Ltd., has been named distributors for the formaldehyde materials to be produced by this new plant.

W. Bruce Findlay, executive vice president of Rubberset Co., Ltd., Gravenhurst, Ont., recently was elevated to the presidency of the company.



W. Bruce Findlay

NEWS ABOUT PEOPLE

Norman A. Shepard, chemical director of American Cyanamid Co., New York, N. Y., has been appointed chairman of a new committee on materials of the Research & Development Board, United States Department of Defense, Washington, D. C. According to Board Chairman Walter G. Whitman, the new committee has been set up to consolidate research and development projects in the materials field and will have jurisdiction over materials matters formerly handled by various RDB committees. After receiving his doctorate and teaching at Yale University, Dr. Shepard became director of organic chemical research, then director of chemical research, for Firestone Tire & Rubber Co. He joined American Cyanamid in 1936 as director of technical service and has held his current position with the company since 1941. During the war Dr. Shepard served in an advisory capacity to the Baruch-Conant-Compton Rubber Survey Committee, the Rubber Reserve Co., the WPB, and the Office of Scientific Research & Development. He has served as a member of the RDB Committee on Equipment and Materials since its inception. The new committee will have as executive director John H. Garrett, of the RDB secretariat.

R. E. Schreiber, sales manager, Monarch Rubber Co., Hartsville, O., is a member of the 1952 membership committee of the Material Handling Institute.

Alfred W. Crew has joined Republic Rubber Division, Lee Rubber & Tire Corp., Youngstown, O., as a field engineer, with headquarters in Charleston, W. Va., from where he will serve coal mine operators and industrial accounts on Republic's belting, hose, and packing in the major portion of the state. Previously Mr. Crew had been with Joy Mfg. Co., representing it for the past 15 years in the West Virginia coal fields.

John F. Corcoran has been appointed director of sales by Union Asbestos & Rubber Co., 332 S. Michigan Ave., Chicago 4, Ill. After ten years with the American Locomotive Co. in sales offices in New York, Washington, Atlanta, and Chicago, Mr. Corcoran opened his own office in Washington in 1950 and represented a group of firms engaged in the railway supply business, among which was Union Asbestos.

William P. Barnes, Jr., has joined the staff of mechanical engineers working on combustion projects at Atlantic Research Corp., Alexandria, Va. Previously he had served in the machine design division of Goodyear Tire & Rubber Co. and had also been employed by E. I. du Pont de Nemours & Co., Inc., and Hercules Powder Co.

Edwin N. Cunningham has been appointed assistant sales manager of Precision Rubber Products Corp., Dayton, O. He had joined the firm's technical sales service in January, 1951. His previous connections were with The B. F. Goodrich Co. and Enjay Co., Inc.



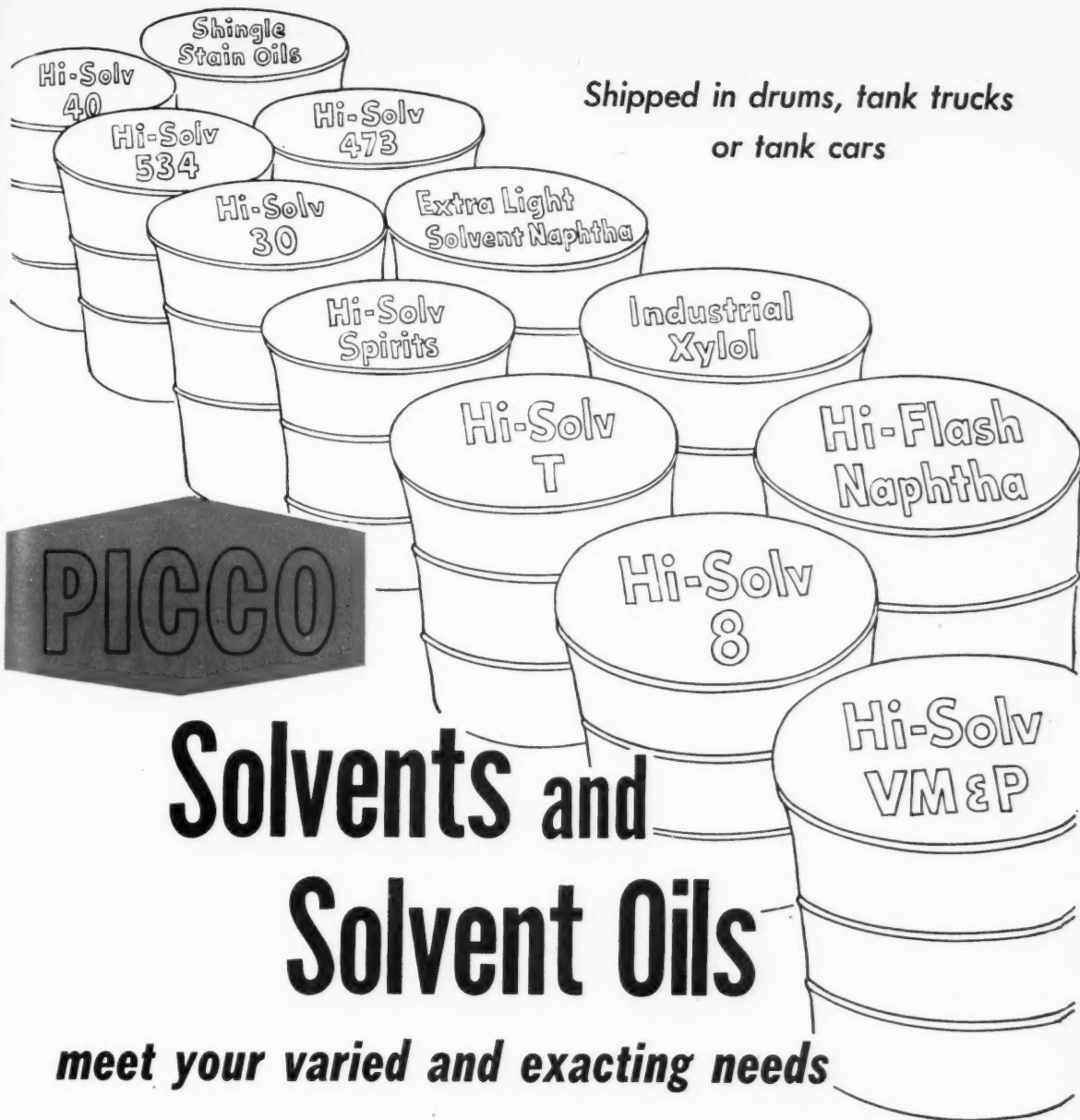
Roy H. Marston, Jr.

Roy H. Marston, Jr., has been appointed resident manager of the Akron office of Binney & Smith Co., 41 E. 42nd St., New York, N. Y. This position has been held for the past 22 years by E. H. Baker, who retired February 1. Mr. Marston has been associated with Mr. Baker for the past 15 years in the area served by this office. He has covered the rubber, paint, ink, and paper industries in western Pennsylvania, West Virginia, Ohio, Indiana, Michigan, and Wisconsin. For the past eight years, he has been on the executive committee of the Akron Rubber Group. Before joining Binney & Smith, Mr. Marston was with Thilmany Pulp & Paper Co.

Bailey Bennett is now principal chemist in the resin and rubber division of Battelle Memorial Institute, Columbus, O. Previously he had been research associate in the department of agricultural biochemistry of The Ohio State University.

Ray L. Morrison, executive vice president of DeVilbiss Co., Toledo, O., has been elected president of the Northwestern Ohio Industrial Council. He succeeds Jules D. Lippmann, president of the Textile Leather Corp.

Otto J. Lang has been appointed general manager of operations of K. B. C. Industries, Inc., 881 State St., New Haven, Conn. K. B. C. is presently engaged in custom mixing of rubber, synthetic rubbers of all types, and plastics and plans expanding its facilities into the rubber manufacturing field. Mr. Lang most recently was director of research and development of Vulcan Rubber Products, Inc., and before that was associated for a number of years with Armstrong Rubber Co. as chief chemist and head of the technical division. He was also closely associated with the early commercial development of cold rubber. He is a member of the American Chemical Society and of the Connecticut and the New York Rubber groups and has served on various committees of the latter group.



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OBITUARY

F. C. Biggert, Jr.

FLORENCE C. BIGGERT, JR., chairman of the board of United Engineering & Foundry Co., Pittsburgh, Pa., and one of the pioneers in the design of continuous strip mills for the steel industry, died suddenly February 10 in a Pittsburgh hospital.

Born in Crafton, Pa., August 20, 1878, the deceased received a mechanical engineering degree from the Western University of Pennsylvania (now Pitt) in 1899.

In this same year he started with Frank-Kneeland Machine Co., which two years later merged with the newly formed United Engineering & Foundry Co., with Mr. Biggert as assistant chief engineer. He became chief engineer in 1913, second vice president in 1915, president and general manager in 1919, and chairman of the board of directors in 1943.

Although devoting most of his time to research on patents and innovations in the iron and steel industry, Mr. Biggert also found time to act as chairman of the general government committee of the Crafton Borough Council and as director of the local bank.

He was also a member of the Chartiers Country and Duquesne Clubs, Hawthorne Presbyterian Church of Crafton, and American Society of Mechanical Engineers.

Funeral services were held February 13 at the Presbyterian Church, followed by burial in Chartiers Cemetery.

Survivors include his wife, one son, and four grandchildren.

Joseph A. White

JOSEPH A. WHITE, sales manager of William F. Mayo Co., a division of United States Rubber Co. in Boston, Mass., died suddenly of a heart attack February 28 at Pompano Beach, Fla.

Starting as a salesman of the footwear division of U. S. Rubber in the Boston branch in September, 1926, he became sales manager of that branch in December, 1941. He was appointed sales manager of the Mayo company in February, 1946.

The deceased was born in Houlton, Me., 57 years ago.

Mr. White was a member of Our Lady, Help of Christians Church, Newton, Mass., where a Requiem Mass was sung March 4. He also belonged to the 4th Degree in the Knights of Columbus, the Holy Name Society, and the American Legion.

Interment was in Bangor, Me.

He is survived by his wife, his father, two sisters, and two brothers.

Arthur E. Bendelari

ARTHUR E. BENDELARI, former president and director emeritus of The Eagle-Picher Co., Cincinnati 1, O., died of a heart attack at his home outside Lexington, Ky., on February 10.

The deceased was born in Toronto in 1879, the son of the Italian consul general to Canada. He was educated in the schools there and became a mining supervisor in the Tri-State field when only 21 years old.

He was manager of the Yellow Dog lead-zinc mine; then left to operate the properties of the Picher Lead Co., for several years prior to its merger in 1916 with The Eagle White Lead Co. He remained in that capacity after the merger. In 1929 he was elected president of The Eagle-Picher Co. and retired in 1937. The deceased continued, however, as a director of the company after his resignation, as well as Eagle-Picher representative to the American Mining Congress, American Zinc Institute, and Lead Industries Association.

The honorary doctor of science degree was conferred upon him by Franklin & Marshall College.

Mr. Bendelari belonged to the Union League Club and the Masons, besides many professional societies.

Survivors include his wife and a brother.

Harry T. Dunn

HARRY THATCHER DUNN, 76, president of Fisk Rubber Co., Chicopee Falls, Mass., from 1915 until 1933, died February 19 in West Palm Beach, Fla., after a brief illness.

Mr. Dunn, active in the development of the tire and automobile industries started his business career as a bicycle salesman. He joined Fisk Rubber Co. about 1900. He was elected a vice president of Willys-Overland Co. in 1915, but resigned to devote all his time to Fisk and Federal Tire & Rubber Co. Eventually he became president of both these concerns. In 1933, Dunn left Fisk to become a partner in J. R. Timmins & Co., Inc., New York stockbroker, continuing his association with them even after his retirement as a partner in 1948.

The deceased was born in Gardner, Mass., and educated at the Cushing Academy.

During World War I, Harry Dunn served as chief of the rubber section of the War Industries Board in Washington. At various times he was vice president of the Rubber Club of America, president of the Motor & Accessory Manufacturers Association, president of the Rubber Manufacturers Association (1921-1922), and a director of the old Rubber Institute.

Surviving are his wife, a daughter, and a brother.

Funeral services were held February 22 at his daughter's home in Wellesley, Mass.

FINANCIAL

Allied Chemical & Dye Corp., New York, N. Y. For 1951: net income, \$40,548,649, equal to \$4.58 a common share, against \$41,212,520, or \$4.65 a share, in 1950.

Brown Rubber Co., Inc., Lafayette, Ind. For 1951: net earnings, \$959,415, equal to \$2.55 a common share, compared with \$1,472,944, or \$3.91 a share, in 1950: provision for depreciation, \$213,677, against \$156,731; federal income taxes, \$1,091,608, against \$1,321,791; current assets, \$2,610,152, current liabilities, \$804,479, against \$2,191,447 and \$582,592, respectively on December 31, 1950.

Carborundum Co., Niagara Falls, N. Y. For 1951: net income, \$6,474,692, equal to \$4.24 a share, against \$7,530,859, or \$4.93 a share, in 1950; net sales, \$72,218,436, against \$56,683,148.

Crown Cork & Seal Co., Baltimore, Md. For 1951: net income, \$3,614,915, equal to \$2.54 a common share, against \$2,486,214, or \$1.60 a share, in 1950.

Crown Cork International Corp., Baltimore, Md. For 1951: net income, \$565,959, equal to \$3.01 a Class A share, against \$398,296, or \$2.12 a share, in 1950.

Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., Canada. Year ended December 31, 1951: net profit, \$446,871, against \$304,202 in 1950; provision for depreciation, \$438,220, against \$382,307; provision for income taxes, \$395,000, against \$333,723; current assets, \$9,494,621, current liabilities, \$3,067,762, against \$8,339,845 and \$2,866,206, respectively, at the previous year-end.

Flintkote Co., New York, N. Y., and subsidiaries. For 1951: net income, \$5,516,371, equal to \$4.11 each on 1,260,435 common shares, contrasted with \$7,703,255, or \$5.83 a share, the year before; net sales, \$84,265,587, against \$83,879,811; income taxes, \$5,579,013, against \$7,082,612.

Dividends Declared

COMPANY	STOCK	RATE	PAYABLE	STOCK OF RECORD
Belden Mfg. Co.	Com.	\$0.40 q.	Mar. 3	Feb. 18
Brunswick-Balke-Collender Co.	Com.	0.25	Mar. 15	Mar. 1
Canadian General Electric, Ltd.	Com.	2.00 q.	Apr. 1	Mar. 14
Canadian Tire Corp., Ltd.	Com.	0.15	Mar. 1	Feb. 21
Carborundum Co.	Com.	0.25	Mar. 10	Feb. 25
Endicott Johnson Corp.	Com.	0.40	Apr. 1	Mar. 21
	4% Pfd.	1.00 q.	Apr. 1	Mar. 21
Flintkote Co.	Com.	0.50 q.	Mar. 10	Feb. 25
	\$4.00 Cum. Pfd.	1.00 q.	Mar. 15	Mar. 1
Goodyear Tire & Rubber Co.	Com.	0.75	Mar. 15	Feb. 15
	Pfd.	1.25 q.	Mar. 15	Feb. 15
I. B. Kleiner Rubber Co.	Com.	0.25 q.	Mar. 12	Feb. 15
Mansfield Tire & Rubber Co.	Com.	0.25 q.	Mar. 12	Feb. 15
Phelps Dodge Corp.	6% Pfd.	0.23	Mar. 10	Feb. 25
Plymouth Rubber Co., Inc.	Com.	1.25 q.	Mar. 10	Feb. 25
Plymouth Rubber Co., Inc.	Com.	0.12 1/2 q.	Mar. 15	Feb. 29
Seiberling Rubber Co.	Com.	0.25 q.	Mar. 10	Feb. 25
	4 1/2% Pfd.	1.13 q.	Apr. 1	Mar. 15
	5% Pfd.	1.25 q.	Apr. 1	Mar. 15
Thermoid Co.	Com.	0.20 q.	Mar. 31	Feb. 29
Tyer Rubber Co.	\$4.25 Pfd.	1.06 3/4 q.	Feb. 15	Feb. 11
United Elastic Corp.	Com.	0.60 q.	Mar. 10	Feb. 20
United States Rubber Co.	Com.	1.50	Mar. 10	Feb. 19
	8% 1st Pfd.	2.00	Mar. 10	Feb. 19
	8% 1st Pfd.	2.00	June 10	May 21
Viceroy Mfg. Co., Ltd.	Com.	0.30 q.	Mar. 15	Mar. 1

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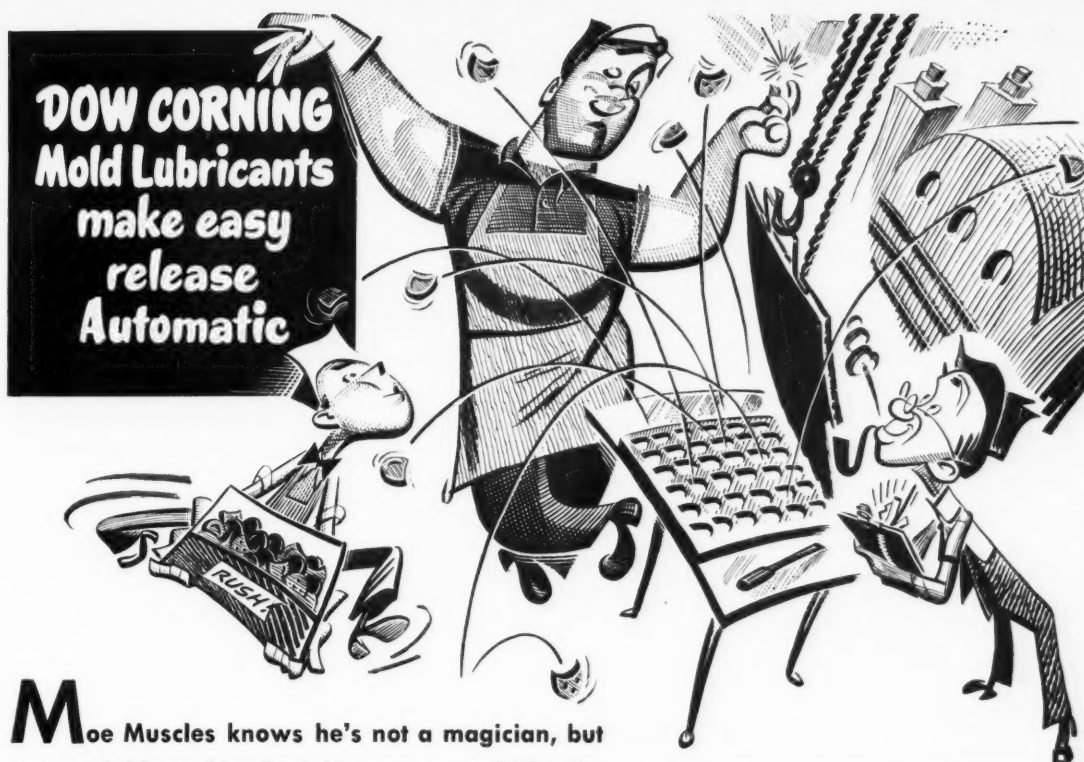
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WORLD



Moe Muscles knows he's not a magician, but you can't blame him for taking some credit for the performance of Dow Corning Silicone mold release agents. Molded parts almost pop out of Dow Corning silicone treated molds, and he knows it. Release becomes a positive thing. It's more than freedom from sticking, even in molding heavily loaded stocks, heavy duty tires, precision moldings, or parts formed in complicated or deep cavity molds.

What's more, Inspector Mike can now be a pal instead of a stinker. Here's why. Unlike any other kind of mold lubricant, Dow Corning Silicones give easy release without build-up on the mold surfaces. Clean molds stay clean; scrap is reduced to the vanishing point; and you get top quality moldings with the kind of finish that sells to critical customers.

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EMULSIONS for molds and curing
bags; MOLD RELEASE FLUID in solvent
solution for green carcass, bead and
parting line release.



Baldwin-Lima-Hamilton Corp., Philadelphia, Pa., and wholly owned subsidiaries. For 1951: net earnings, \$4,555,196, equal to 96¢ a share, compared with \$3,671,930, or \$1.01 a share, in 1950; sales, \$197,690,658, against \$94,385,752; income taxes, \$6,500,000, against \$2,875,000.

DeVilbiss Co., Toledo, O., and wholly owned subsidiary. For 1951: net profit, \$1,025,177, equal to \$3.42 each on 300,000 capital shares, compared with \$1,195,430, or \$3.98 a share, in 1950; net sales, \$19,764,455, against \$15,087,145; income taxes, \$1,409,550, against \$1,131,274.

Diamond Alkali Co., Cleveland, O. For 1951: net earnings, \$6,674,297, a new high and equal to \$2.95 a common share, compared with \$4,829,620, or \$2.14 a share, in the preceding year; net sales, \$80,748,796, another record, against \$55,702,575; federal income taxes, \$12,324,163 against \$4,368,233.

Eagle-Picher Co., Cincinnati, O., and domestic subsidiaries. Year ended November 30, 1951: net profit, \$3,703,807, equal to \$4.11 a share, compared with \$2,929,296, or \$3.25 a share, in the preceding 12 months; net sales, \$82,086,318, a record, against \$69,123,903; provision for income taxes, \$5,800,000, against \$3,470,000.

Endicott Johnson Corp., Endicott, N. Y. Year ended November 30, 1951: consolidated net profit, \$2,329,302, equal to \$2.52 each on 810,720 common shares, compared with \$1,391,683, or \$1.36 a share, in the preceding fiscal year; provision for federal income taxes, \$3,650,000, against \$2,230,000.

General Tire & Rubber Co., Akron, O. Year ended November 30, 1951: net income, \$7,790,467, equal to \$12.48 each on 593,504 common shares, contrasted with \$8,557,616, or \$13.88 each on 586,419 shares, in the preceding fiscal year; net sales, \$170,771,521 (a new high), against \$125,375,837; federal income taxes, \$12,750,000, against \$7,160,800.

E. F. Goodrich Co., Akron, O., and subsidiaries. Year ended December 31, 1951: net income, \$34,742,881, equal to \$8.15 each on 4,133,969 common shares, compared with \$34,708,355, or \$8.06 each on 1,367,543 shares, the year before; net sales, \$637,722,241 (a record), against \$543,312,294; reserve for depreciation, etc., \$10,065,979, against \$9,265,036; income and excess profits taxes, \$78,509,000, against \$45,370,000; current assets, \$315,626,605, current liabilities, \$126,985,721, against \$262,302,281 and \$90,379,123, respectively, on December 31, 1950.

Johns-Manville Corp., New York, N. Y., and consolidated subsidiaries. Year ended December 31, 1951: net profit, \$24,530,509, equal to \$7.76 each on 3,162,675 common shares, compared with \$22,814,491, or \$7.29 each on 3,129,429 shares, in the preceding year; net sales, \$238,034,399, against \$203,272,945; taxes, \$29,756,991, against \$20,033,604.

Johnson & Johnson, New Brunswick, N. J. For 1951: net income, \$8,276,000, equal to \$3.85 a common share, against \$13,281,000, or \$6.49 a share, in 1950.

Glidden Co., Cleveland, O. Three months ended January 31, 1952: net profit, \$1,366,399, equal to 60¢ a common share, against \$2,655,343, or \$1.29 a share, a year earlier.

Goodyear Tire & Rubber Co., Akron, O., and subsidiaries. Year ended December 31, 1951: net earnings, \$36,628,296, a new high and equal to \$8.18 each on 4,130,564 common shares, compared with \$35,109,355, or \$7.81 each on 2,065,303 shares, in 1950; net sales, \$1,101,141,392 (the first rubber company to hit the billion-dollar mark), against \$845,138,051; income and excess profits taxes, \$74,911,921, against \$48,894,366; current assets, \$506,720,355, current liabilities, \$107,249,578, against \$355,971,277 and \$66,859,872, respectively, on December 31, 1950.

Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., Canada. For 1951: net profit, \$3,976,536, equal to \$14.26 a common share, against \$2,146,225, or \$7.14 a share, in the preceding year; working capital, \$15,540,112, against \$11,569,486.

Monsanto Chemical Co., St. Louis, Mo., and subsidiaries, except British and Australian ones. For 1951: net income, \$22,477,884, equal to \$4.70 each on 4,868,189 common shares, compared with \$26,220,333, or \$5.37 each on 4,704,216 shares, in 1950; sales, \$272,845,034, against \$227,135,206.

Plymouth Rubber Co., Inc., Canton, Mass. Year ended November 30, 1951: net profit, \$791,636, equal to 88¢ a share, contrasted with \$962,486, or \$1.07 a share, a year earlier; sales, \$16,173,252 (a new high), up 10.4%.

Rome Cable Corp., Rome, N. Y. Nine months ended December 31, 1951: net profit, \$1,101,000 equal to \$2.24 each on 481,762 common shares, compared with \$991,151, or \$2.31 each on 407,975 shares, in the 1950 months; reserve for federal taxes, \$2,500,000 against \$1,281,000.

Struthers Wells Corp., Titusville, Pa. Year ended November 30, 1951: net income, \$1,241,012, equal to \$4.74 a common share, against \$915,154, or \$3.48 a share, in the preceding 12 months; net sales, \$18,325,960, against \$11,662,136.

Union Carbide & Carbon Corp., New York, N. Y., and subsidiaries. For 1951: net income, \$103,889,711, equal to \$3.60 each on 28,806,344 capital shares, compared with \$124,111,851, or \$4.30 a share, a year earlier; net sales, \$927,519,805, a record, against \$758,253,539; income and excess profits taxes, \$164,496,354, against \$113,693,689.

United States Rubber Co., New York, N. Y. For 1951: net profit, \$30,366,449 (a record), equal to \$14.29 a common share, compared with \$24,657,647, or \$11.04 a share, in 1950; sales, \$837,222,092 (a new high), against \$695,755,923; depreciation and obsolescence, \$13,999,058, against \$13,401,668; current assets, \$354,727,449, current liabilities, \$177,697,159, against \$280,372,183 and \$112,461,434, respectively, at the end of 1950.

Pittsburgh Plate Glass Co., Pittsburgh, Pa., and subsidiaries. For 1951: net income, \$31,075,981, equal to \$3.44 each on 9,030,182 capital shares, contrasted with \$41,928,749, or \$4.64 a share, the year before; net sales, \$404,202,528, a new high, against \$337,186,034; taxes, \$72,913,833, against \$43,617,847.

New Upholstery Fabrics

A COMPLETE line of all-plastic upholstery fabrics, including jacquard, dobby, and plain weaves, was shown to the trade by Firestone Plastics Co., Pottstown, Pa., at the Southern Furniture Market late in January. More than 100 different fabrics are now available, all woven of Firestone's Velon, and cover a wide range of styles from traditional to modern. The display represented the work of seven selected weavers and rounded out the line begun commercially more than six months ago with the Sailboat jacquard pattern woven by Swift Mfg. Co. and used in casual furniture.

Other patterns featured included Comet, a jacquard by Wortendyke Mfg. Co.; Bristol and Birmingham, two jacquards by Swift; Minuet, a small dobby by Martin Bros.; and Heather, a muted plaid by Hafler Associates. Other weavers in the display group included Albert J. Barton, Inc.; Lucien Forestier Corp.; and E. W. Twitchell. Florals, abstracts, geometrics, and plaids are included in the complete line.

In commenting on the fabrics, Elmer French, company vice president, stated that "the enthusiastic reaction to these new jacquards and texture-like weaves at the markets has more than justified our development and promotional efforts of the past 2½ years."

Navy to Use Plastic Pipe

AS THE result of an eight-month sea test aboard a destroyer escort, the Navy plans to install plastic piping in several minesweepers now being built, it was announced by Rear Admiral Homer N. Wallin, chief of the Bureau of Ships. The piping is made from a fiber glass bonded together with polyester-type resin. Pipe sections are joined together by means of sleeves, and the clearance spaces between pipe and sleeve are filled with the resin, which is then allowed to harden. Repairs of leaks or breaks in a pipe can be made by wrapping a strip of glass tape around the damaged section and impregnating the strip with the resin.

In the minesweepers the plastic pipe will save about two tons of copper and nickel piping, in addition to providing savings in installation and maintenance costs. The plastic pipe is resistant to shock and unaffected by salt water. While the tests run on the destroyer escort proved the serviceability of plastic pipe, some problems of installation remain to be solved. For example, techniques are needed which will permit the resins used to join the pipes to be applied in all temperatures. As yet, the resins show a tendency not to harden in cold weather. Besides metal socket fittings must still be used because the plastic fittings so far tried have been handmade and difficult to manufacture.

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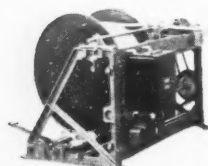
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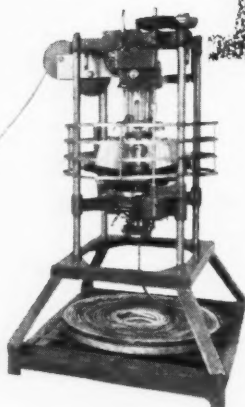
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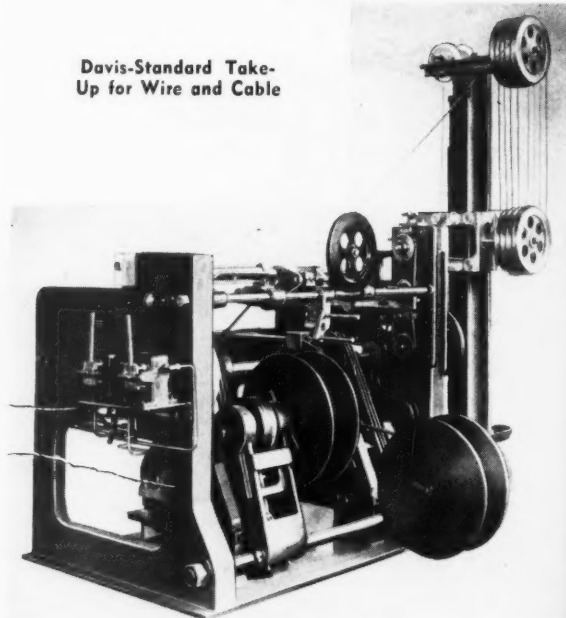
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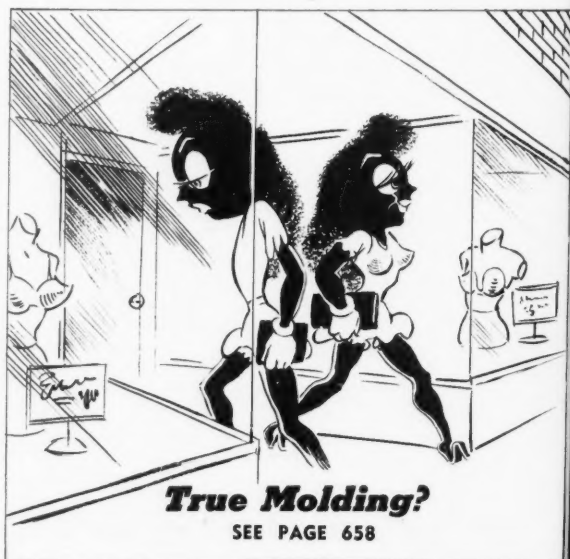
Davis-Standard Take-Up for Wire and Cable



Wire and Cable Take-Up

A NEW take-up unit for electrical wire and cable is being marketed by Standard Machinery Co., 20 Water St., Mystic, Conn. Called the Davis-Standard take-up, the unit is said to embody several new features which overcome the difficulties that have plagued the wire industry for many years. The take-up has no gears or clutches and is built to operate smoothly at high production speeds. The reel drive is by double V-belts, with a brake which automatically stops the reel as it is disengaged. The traverse mechanism is of new design, air actuated, and positive in operation. The reels are shifted in and out of engagement by air pressure, and the reel is shifted to floor level to prevent any damage by dropping.

A choice of speed change methods for constant tension control is provided, as well as an efficient dancer control column.



True Molding?

SEE PAGE 658

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Although of rugged construction for dependable service, the take-up features lack of noise or vibration in operation. The reel arbor is removable, and adaptation can be made for the use of coiling heads if desired. Automatic cut-over is also available. The take-up is built in sizes to take reels from 6-36 inches in diameter, and larger sizes can be furnished to special order.

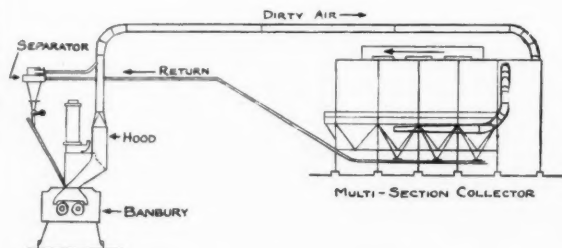


Diagram of Hale & Kullgren Dust Control System for Banbury Mixer

Banbury Dust Control System

A NEW and effective dust control system for Banbury mixers is now being offered by Hale & Kullgren, Inc., First Federal Savings Bldg., Akron 8, O. With this system, carbon black or other dust that is picked up as it escapes from the mixer is collected and returned to the mixer in a matter of seconds, so that it is mixed into the batch for which it was originally intended.

The principle feature of the system is a hood arranged to pass a high-velocity stream of air across all dust escape points of the mixer. The mixture of dust and air is exhausted to a cloth-type, multi-section collector. The collected dusts are discharged and returned by a pneumatic conveying system to a separator, from which they are injected into the mixing chamber. The dust travels the complete cycle in a matter of seconds.

The arrangement of the system permits the use of a large volume of air in the mixer hood so that no dust is allowed to escape. The system can also be easily arranged to include an automatic sack-disposing unit that will carry away and collect paper sacks or containers used for carbon black or compounds. These sacks can be conveyed to a sack-catching chamber at the collector where they are held for periodic disposal. Where more than one Banbury is used, a separate dust control system is installed for each mixer.

Foam Rubber Splitter



Campbell Model 65 Foam Rubber Splitter

THE Campbell Model 65 foam rubber splitter, a new machine which will split large rolls or slabs of foam rubber materials as thin as 1/8-inch, has been announced by Falls Engineering & Machine Co., Cuyahoga Falls, O. Designed by the Campbell Machinery Development Co., the new machine is expected to provide economies and new opportunities for dealers in the foam rubber products field. With this splitter, a dealer can buy foam rubber stock in rolls and slabs and split them to the thickness required for any particular job.

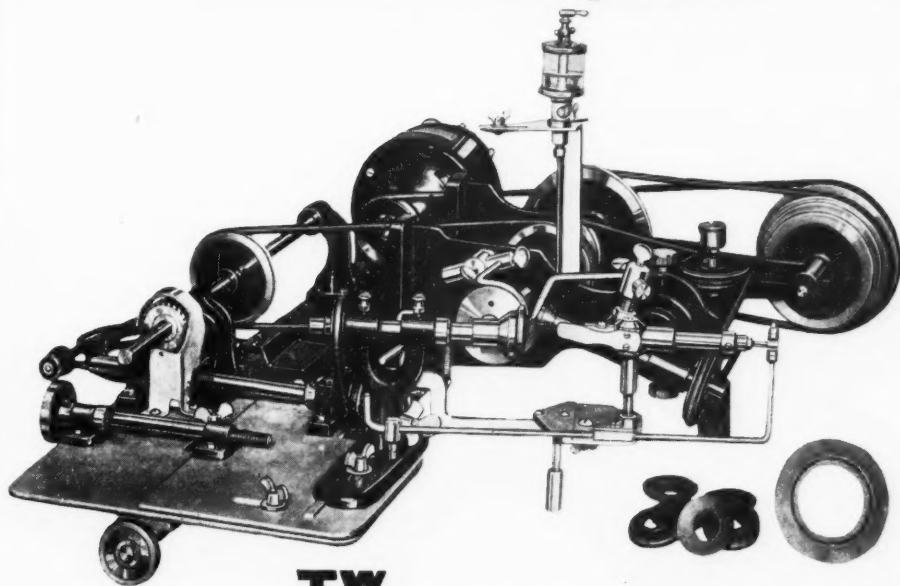
The machine, therefore, eliminates the need by dealers of carrying large stocks or sending out stocks to be split for individual jobs.

The splitter handles roll stock up to 36 inches in diameter, and up to 65 inches wide. Dials calibrated to 0.001-inch are used

(Continued on page 772)

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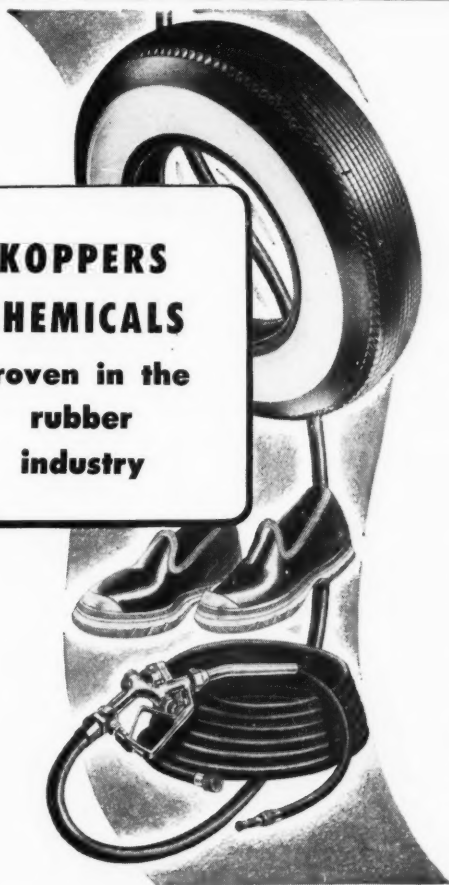
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★**RESORCINOL** is used for preparation of adhesives that assure a strong bond between rubber and fabric or cords. Koppers Resorcinol used in pre-dip treatment produces excellent bonding of rubber to cotton, rayon and nylon fabrics.

★**DI-tert-BUTYL-para-CRESOL** has wide application as an antioxidant in white rubber products. It retards cracking, checking, hardening or loss of strength without discoloring the product or staining materials with which the product comes in contact.

★**STYRENE MONOMER** polymerizes with active olefinic compounds to produce GR-S type synthetic rubbers.

★**DI-tert-BUTYL-meta-CRESOL** is suggested for use in the preparation of hard rubber or ebonite from GR-N synthetic rubbers. It is reported to improve tensile strength of ebonite and increase tackiness of the stock. Sulfides of DBMC have been reported to be effective peptizing agents for reclaiming of GR-S type synthetic rubbers.

★**MONO-tert-BUTYL-meta-CRESOL** has been reported to be an effective anti-flex cracking agent in rubber and rubber-like materials. And the resin obtained by condensation of MBMC with formaldehyde has been shown to impart tack to GR-S rubber.



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FAR EAST

MALAYA

Research on Hevea

Various questions relating to the rubber hydrocarbon of *Hevea brasiliensis* have in the past been studied in America and Europe, but since these investigations were necessarily carried out on preserved latex, and adequate answers are obtainable only in the producing territories, it was decided by the British Rubber Producers' Research Association and the Rubber Research Institute of Malaya, as part of a joint program of fundamental research, to institute studies in *Hevea* rubber in Malaya. In September, 1948, G. F. Bloomfield, of the B.R.P.R.A., came to Malaya and worked in the Rubber Research Institute laboratories until January, 1951, part of the time in collaboration with members of the Institute's staff. A preliminary report on the investigations, presented in six parts, has been published in Communications 271, 272, and 273, of the *Journal of the Rubber Research Institute of Malaya*, for January, 1951.

Part I, "Molecular State of the Rubber Hydrocarbon in Freshly Tapped Latex," discusses the basis of viscometric and osmotic measurements. It was shown that the rubber hydrocarbon, as it leaves the tree, is already in high polymer form. Further that inherent viscosities, whether determined with solutions of latex in benzene or on dried rubbers, are independent of concentration below 0.05-gram per 100 milliliters and are therefore numerically equal to intrinsic viscosities.

Marked differences in intrinsic viscosity were observed between trees, but little systematic difference between tappings of each individual tree in regular tapping so that average molecular weight of rubber is a specific characteristic of the tree.

Part II treats of "The Gel Content of Rubber in Freshly Tapped Latex."

Extraction of vacuum-dried films, prepared from fresh latex with purified petroleum ether under conditions preventing agitation or contamination of the material, revealed the presence of a considerable proportion of gel rubber. The gel component was found to be cross-linked, but cross-linking is confined to the individual latex particles, i.e., as microgel. When latex is stored, the gel content increases, and the gel appears more cross-linked.

Part III concerns the "Fractionation of Fresh Rubber and the Interpretation of Viscometric and Osmotic Data." These data show that normally tapped *Hevea* rubber, not only as it leaves the tree, but also in dried freshly coagulated latex and in year-old smoked sheet, comprises a series of polymer homologs in the molecular weight range 50,000 to over 3×10^6 , with the major proportion of the hydrocarbon in the range of a million and over. Generally the order of magnitude of intrinsic viscosities, hence of derived molecular weights, is considerably higher than observed in European and American studies. There was no appreciable proportion of components of molecular weight sufficiently low to classify them as viscous liquids; consequently there is little support for the idea that the softness of the interior of a latex particle or the capability of latex particles to fuse together can be attributed to the presence of an outer sheath containing a viscous fluid the proportion of which would be considerable relative to the outer shell. The interpretation of viscosity data is complicated by the presence of the gel component. Examination of the effect of addition of non-solvents to rubber solutions in good solvents supports the currently accepted hypothesis that polymer molecules are in general less asymmetric in poor solvents than in good solvents.

"Factors Affecting the Plasticity of Raw Rubber and Some New Data on Hardening of Rubber by Benzidine" is the title of Part IV. It was found that while rubbers of high viscosity tend to be hard and those of low viscosity, soft, the converses are not necessarily true. There is no general correlation between plasticity and intrinsic viscosity so that solution viscosity cannot be used as a reliable guide to the processing characteristics of the rubber. Hardening of rubber by benzidine does not require the presence of oxygen. Removal of acetone-soluble components of rubber gives a disproportionately large increase in hardness which is not due to any permanent structural change in the rubber.

Part V covers "Oxygenated and Low Molecular Fractions in Fresh Rubber." The presence in rubber of oxygenated low molecular constituents with molecular weights (estimated from intrinsic viscosity) below 100,000 and with oxygen content of 0.3 to over 1%, indicated by previous work in Europe and in the East, was confirmed. The oxygenated fractions are soft

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SEE REVERSE SIDE

plastic rubbers which on hydrolysis yield viscous gums of similar viscosity to the parent substances. The oxygenated fractions as well as their hydrolysis products contain active hydrogen which, if present in hydroxyl or carboxyl groups, corresponds to an appreciable proportion of the oxygen contents.

Finally, Part VI concerns "Characteristics of Rubber in Latex of Untapped Trees and in Branches of Trees in Regular Tapping."

Untapped or long-rested trees frequently contain microgel latex yielding solutions of low intrinsic viscosity, but very small osmotic pressure; these latexes give very hard rubbers. When tapping is started on a tree containing microgel latex, inherent viscosity of the latex solutions increases steadily, and the rubber obtained from it become progressively softer; after about ten tapplings, the latex is more or less normal. Some clones, as PB 186, do not contain much microgel latex.

The identification of microgel latex aids in defining the area of bark affected by tapping; in high-yielding trees the affected area tends to be larger than in low yielders. When two tapping cuts are opened on the same tree, the upper cut at first contains more microgel latex than the lower cut and yields harder rubber.

Production and Exports of Rubber

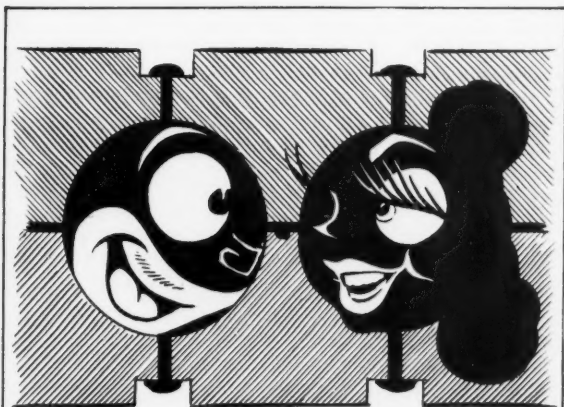
Rubber production in Malaya in 1951 totaled 605,348 tons, 88,742 tons below the 1950 figure. The drop is attributed mainly to bandit activity and the resulting dislocation and inefficiency of labor; in some sections of the country abnormally bad weather and stealing of rubber also played a part in the decline.

In view of the steps being taken to induce smallholders to replant, it is worth noting that the reduction was as heavy for smallholder as for estate rubber, while the former were less affected by guerilla activities than the latter. It seems clear then that lower outputs here were largely due to decreased productivity of the trees, in which overtapping in the last few years was a factor.

Exports from Malaya came to 1,155,264 long tons and included 547,100 tons of imported rubber chiefly from Indonesia, Sarawak, Borneo, Burma, and Indo-China. The imports constituted a record and were 100,450 tons higher than those of 1950. Total shipments were made up of 754,215 tons ribbed smoked sheet; 9,505 tons thin latex crepe; 52,665 estate brown crepe and compo crepe; 56,829 tons thin remilled crepe; 210,845 tons thick remilled (blanket) crepe; 10,075 sole crepe; 60,385 latex and 745 tons miscellaneous.

Smallholdings Committee for Replanting

The Rubber Smallholdings Inquiry Committee in its final report to the Federal Legislative Council, January 30, revealed that out of 1,403,000 acres of smallholder rubber, 375,000 acres were more than 40 years old, 562,000 acres between 30 and 40



True Molding?

SEE PAGE 658

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years, 339,000 between 20-30 years old, and only 127,000 acres 20 years or less; it recommended that all this rubber except that 20 years old or less should be replanted within the next 10 years. This replanting was advised not only because the trees were old and had been heavily overtapped, but also because of the inherently low productivity of smallholder rubber as compared with that of modern improved material. The oldest rubber, comprising more than 900,000 acres, is already in need of replanting, it was added.

While it is recognized that replanting on such a vast scale would seriously disturb Malayan revenue and might reduce output of smallholdings as much as 80%, it is also emphasized that the alternative to replanting is virtual extinction of the smallholding industry as it now exists.

Smallholders are understandably reluctant to cut down their source of income, particularly with prevailing favorable prices, therefore the Committee recommends that the government try to induce them to replant by an offer of \$500 an acre in cash, services, and material, funds for the purposes to be provided by a cess on exports of smallholder rubber. The Committee expressly states that it is opposed to laws seeking to compel smallholders to replant.

Replanting Cess Imposed

That the government had prepared to meet recommendations seems evident from the fact that the Federal Legislative Council ratified the imposition of a cess of 4½ cents per pound on all rubber, purely for the benefit of smallholders' replanting. At the same time the cess for research was increased from 0.3- to 0.4-cent per pound. The replanting cess for smallholders has the support of the Rubber Producers' Council and of the smallholders' representatives on this council. A board is to be set up to administer the fund, and details have been published in a bill to be known as the "Rubber Industry (Replanting) Fund Ordinance" when it is passed by the Federal Legislative Council at its next meeting.

This bill, considered the most important legislation to affect the 50-year-old Malayan smallholdings industry, will place control of the entire replanting scheme with the Board just mentioned. The board will comprise 18 members, including five smallholders' representatives, three members appointed by the government; while the rest will be nominees of the Rubber Producers' Council, the Rubber Growers' Association, The United Planting Association of Malaya, and the Malayan Estate Owners' Association. This body will not only draw up plans for replanting, but will also provide other crops in place of old rubber, since it is also the aim to encourage diversification of crops.

To Prevent Currency Deals

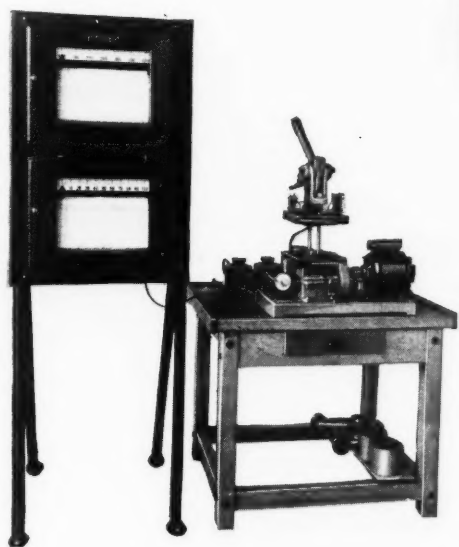
To prevent soft currency countries from using Malayan tin, rubber, and pepper in black market sterling deals for dollars, the Foreign Exchange Control in Singapore has introduced regulations requiring Singapore exporters of these commodities to soft currency ports to produce guarantees from the importer's bank that United States dollars will be provided if the commodities are on-shipped or reshipped to the United States.

INDO-CHINA

At a meeting of the board of the Union des Planteurs de Caoutchouc de l'Indochine (Indo-China Rubber Planters' Association) held in France, November 22, 1951, it was revealed that certain local companies had acquired new equipment for preparing sole crepe and that a substantial increase in the output of this material is looked for. It could also be announced that plans aiming at the setting-up of installations for the bulk storage of latex at Tonlequette, Cambodge, are now being carefully studied by the Association in cooperation with local authorities.

News from Indo-China indicates that the first Viet Nam company for retreading and repairing tires and tubes has just been formed. The company plans also to manufacture all products and equipment relating to retreading, as well as various kinds of rubber articles and to trade in crude and partly worked rubber.

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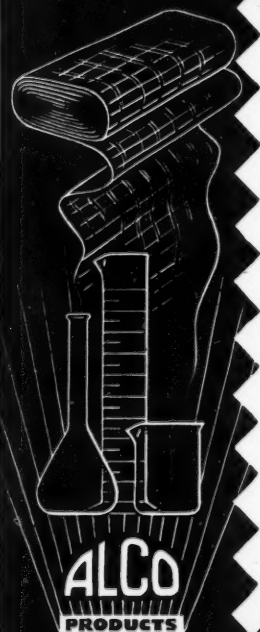
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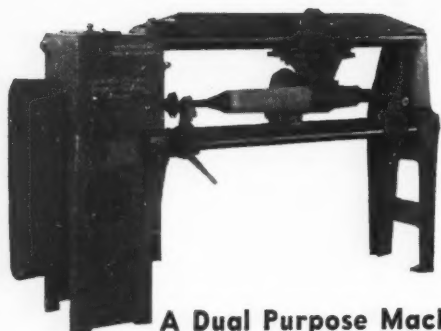
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D.K.G. Conference Papers

A report of the first general meeting and conference of the recently reestablished Deutsche Kautschuk Gesellschaft held in Bad Neuenahr, October 11-13, 1951, appearing in *Kautschuk und Gummi*¹ indicates that this periodical has been appointed the official organ of D.K.G. Some of the papers read at the conference have already appeared.²

The abstract of "Congo Rubber," by S. Bostrom, reveals that the quality of the first postwar shipments of Congo rubber received here showed a surprising improvement over that formerly obtained from this source. This is due to the fact that the production of wild rubber from vines has now largely ceased and has made way for *Hevea* rubber, which is being exploited both on large European estates and on small native holdings, thanks to the efforts of the Institut National pour l'Etude Agronomique du Congo Belge in cooperation with the planters. Native Congo rubber is now held to be equal to remilled crepe from the far East. Tests showed that the Congo rubber has more nerve than the Malayan product and was found to have a higher degree of polymerization. Under comparable conditions, Congo rubber has a higher Defo hardness; the mechanical properties of vulcanizates as hardness, rebound elasticity, tensile strength and elongation are superior to those of Malayan rubber mixes, but the Congo material has a higher albumen content (4.6%, against 3.56%), which causes it to begin to crack sooner.

Another abstract, of "New Elastic Materials," by E. Weinbrenner, deals with the high molecular products obtained by esterification of dibasic acids with excess secondary and tertiary alcohols, reacted with diisocyanates, and the plastics later developed by O. Bayer and collaborators, especially the Vulcollans. It was shown, among the rest, that by appropriately conducted reactions during the preparation of the Vulcollans, CO₂ can be separated, which can then be used *in situ* in the formation of elastic products. It was found that by means of catalysts the conversion of polyesters and diisocyanates can be directed in such a way that the CO₂ cannot escape before cross-linking takes place and thus causes the material to foam. Products obtained this way are the Moltoprenes (sp. gr., 0.04 to 0.5g/cm) which are notable for a high resistance to tearing, resistance to oils, benzene, ozone, and water and which can be worked into any desired shape.

¹3, 11 (1951).

²"Colloid Chemical Considerations of Processes in the Vulcanization and Aging of Rubber," J. Behre, 4, 10, 366 (1951).

"Relation of the Activity of Fillers and Vulcanization," A. Boettcher, 4, 11, 409 (1951).

Some abstracts of papers presented at the conference, 4, 11, 406 (1951).

Rail Buses

To facilitate traveling in the more out-of-the-way places in Germany and also to stimulate tourist traffic in these areas, the German Federal Railway recently developed a system of adapting buses for transportation on both highways and railroads. With the aid of a drive-up ramp, two-axle railway trucks are placed under the forward and the rear sections of the bus and coupled in a few minutes. The rail-bus has a traveling speed of 72 kilometers per hour, on road or rail. The railway officials claim that the new system has the effect of reducing wear of tires and that 30% less fuel is needed to operate the Diesel bus.

The Holofol Process

A new German process for making hollow, seamless goods, known as the Holofol process, is briefly discussed in *Rubber*,¹ organ of the Rubber Stichting, Delft, Holland. According to this source, hollow articles of the most varied description can be made by cutting out and dieing out a single sheet of calendared rubber and then subjecting the shape to a special physico-chemical treatment. The illustrations accompanying the article

¹7, 5, 158 (1951).

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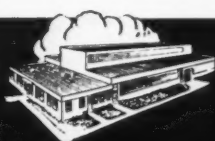
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show inner tubes, gloves, air cushions and mattresses, including some of quite intricate design, and a toy horse.

The advantages claimed for the process are that no welding, cementing, or reinforcing of seams is required; the process eliminates practically all hand-operations; it permits mass-production of hollow goods by a continuous process without hurting the rubber; it requires no complicated equipment. In the manufacture of inner tubes, it is reported, a calendered or extruded strip of unlimited length may be fed into the Holofol apparatus, or the material can first be cut into the necessary lengths and then treated. In the latter case, a finished inner tube is obtained, and, since in most cases the process yields a vulcanized product, no further treatment except powdering is needed.

Siladur, New Resin Solution

According to *Kunststoffe*,¹ Kunststoffgesellschaft m.b.h., Hamburg, recently started producing a new synthetic resin solution, Siladur, a polymerization product of a chlorinated rubber and a silicon resin. The new material is said to withstand temperatures up to 250° C., to be extremely resistant to chemicals (acids and alkalis), and to have unequalled impact resistance. It seems to have found good use in the electrical field; an instance is cited in which electrical, plunger-type heating bodies of ordinary soft steel were coated with the resin and employed continuously for five months for heating a sulfuric acid solution without any sign of attack by the acid. Again it is shown that the high impact resistance of Siladur was responsible for the excellent service given when cases for galvanic electrolytes were lined with the new material.

¹ 42, 1, 23 (1952).

South American Markets

Various German industrialists have been visiting South America with a view to recapturing their prewar markets in the Latin republics. Thus, although the German automobile industry is being hampered by the shortage of raw materials, especially of sheet metal, the owner of the Borgward factories in Bremen, has reportedly been on an exploratory tour to gauge the possibilities of exporting automobiles to Brazil and Argentina. The question of eventually arranging for the assembly of German cars in those countries is also receiving consideration.

The director of a West German firm of tire retreaders, after a recent trip to South America, reported the existence of an unlimited demand for retreading in Brazil and Argentina. The company in question plans a retreading plant in Argentina and may also manufacture tires there.

A recent English visitor to Germany came back with the impression that many well-to-do Germans would like to leave their country because of the Russians. The English reporter added, however, that German suspicion of foreigners and also opposition of German authorities to emigration of just this class of people are preventing such moves.

Plastics Conference and Exhibition

The industrial and scientific associations of the German plastics industry have decided to hold their next plastics conference in Dusseldorf from October 11-19, 1952. It is planned to combine with the conference a big plastics exhibition, the first of its kind in Germany.

Foam Rubber Splitter

(Continued from page 762)

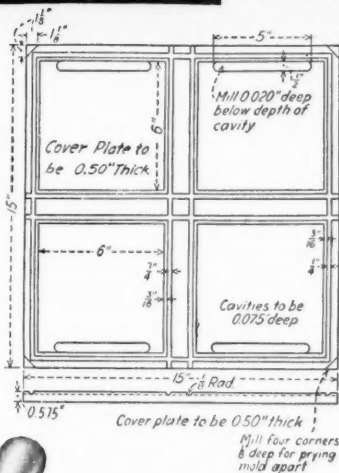
on each of the two feed rolls to control compression of the foam rubber stock as it is fed into the cutting blade, thereby assuring accurate splitting. The machine also incorporates a specially designed blade guide bar which cleans itself of rubber dust particles.

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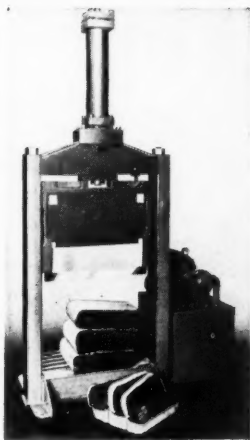
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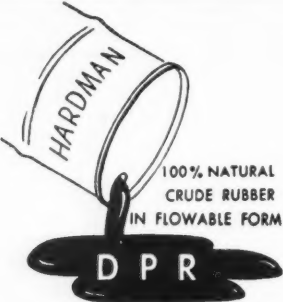
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Editor's Book Table

BOOK REVIEWS

"Statistical Design and Analysis of Experiments for Development Research." Donald S. Villars. William C. Brown Co., 915 Main St., Dubuque, Iowa. Cloth, 5½ by 8½ inches, 472 pages. Price, \$6.50.

Based on courses and lectures given at various universities, this book summarizes the fundamental principles involved in the design of efficient experiments. A journalistic style is employed so that the reader may almost immediately begin applying various analyses to his own data without having to go any deeper into the subject than he desires. Major emphasis is placed on the techniques of small sample statistical analysis for use in laboratory and development work, rather than on large sample analysis applicable to plant or mass-production operation.

Of particular value is a detailed study of replication degeneracy, a design where several different types of treatments are repeated to differing extents. An understanding of the simple principle involved in this design will prevent the beginner from making erroneous "statistical" conclusions. In addition, the author formulates a rational system for determining the correct method of analyzing variance. New and extended tables of variance components are worked out, and a detailed description is given of the technique for applying these components to determine the appropriate error estimate for a legitimate significance test.

Many tables of actual test data and typical calculations are used to illustrate the text. Many of these illustrations are drawn from the author's extensive experience in the rubber industry. While the journalistic approach presents working data early in the book, theoretical considerations are also covered in the later chapters. For the convenience of the beginner, a comprehensive glossary of terms is included, and the book also contains lists of typical problems with their solutions, and both author and subject indices.

"Mechanical Engineers' Handbook." Fifth Edition. Edited by Lionel S. Marks. McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y. Cloth, 6 by 9 inches, 2,253 pages. Price, \$15.

This revised edition of the handbook presents comprehensive and up-to-date information and data on every branch of mechanical engineering, compiled by more than 100 authorities in the field. Although of enlarged format for greater legibility, the new edition retains the 16 section divisions of preceding issues. Individual sections, each further subdivided, are devoted to mathematical tables, and weights and measures; mathematics; mechanics of solids and liquids; heat; strength of materials; engineering materials; fuels and furnaces; machine elements; power generation; hoisting and conveying; transportation; building construction and equipment; machine shop practice; pumps and compressors; electrical engineering; and engineering measurements. The text covers both practice and fundamental theory and is profusely illustrated with tables and diagrams. An index of more than 1,200 entries permits quick finding of desired information.

NEW PUBLICATIONS

"Celogen, A Nitrogen Blowing Agent for Sponge Rubbers and Plastics." Compounding Research Report No. 16. United States Rubber Co., Naugatuck, Conn. 8 pages. This report presents information, including formulations and test results, on the use of Celogen as a non-discoloring, non-staining, non-toxic, and odorless blowing agent for natural or synthetic rubbers and plastics.

"Indonex Plasticizers in 'Cold Rubber' (LTP GR-S) Compounds." Circular No. 13-46. Indoil Chemical Co., 910 S. Michigan Ave., Chicago 80, Ill. 3 pages. Complete information is presented on the formulation and properties of cold rubber compounds plasticized with Indonex 638½ in comparison with compounds containing other types of plasticizers.

"Mildewproofing Agents." Technical Service Report P-17. Witco Chemical Co., 295 Madison Ave., New York 17, N. Y. 12 pages. Descriptions appear of the methods and products used for mildewproofing materials, with special emphasis on 8% copper naphthenate. Abstracts are given of many government specifications on mildewproofing, together with an index of the specifications abstracted.

"N-Butyl Diethanolamine." Bulletin F-7832. Carbide & Carbon Chemicals Co., Division of Union Carbide & Carbon Corp., New York, N. Y. 2 pages. Information appears on the properties, shipping, uses, and potential applications of this new chemical. Suggested applications include use as an intermediate in the preparation of synthetic resins, rubber and plastics stabilizers, surface-active agents, and dyestuffs.

"Vinylite Dispersion Resins—Plastigels." Bakelite Co., Division of Union Carbide. 16 pages. Extensive information and test data are given in this illustrated bulletin on the preparation, flow properties, formulation, and applications of vinyl plastigels. A bibliography of references is also included.

"Neoprene Treated Paper." E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. 16 pages. This bulletin illustrates and describes the properties obtainable in various kinds of papers by adding a few percentages of neoprene latex to the paper pulp. Properties discussed include wet strength, internal bond, impact strength, and chemical resistance. A table of possible applications is also included.

"Neoprene Type WRT." Report No. 52-1. D. B. Forman and R. R. Radcliff. 12 pages. A new neoprene polymer is described as having all the desirable properties of Type W, plus better crystallization resistance than any other general-purpose neoprene. Extensive data on the comparative properties and curing characteristics of Type WRT and W are given in this report.

"Conveyer and Elevator Belting." New York Belting & Packing Co., Passaic, N. J. 32 pages. This illustrated catalog offers complete data for laying out a drive or specifying a conveyer or elevator belt. Information covers carrying capacities, design and construction features, horsepower factors, pulley diameters, plies for proper troughing, and related data.

"Chemical Materials Catalog, 1951-52." Reinhold Publishing Corp. Cloth, 8 by 11 inches, 446 pages. This third annual edition of the catalog presents complete information on the chemicals and chemical products of 106 leading manufacturers. Information given includes formulae, chemical and physical properties, specifications, availability, shipping data, and application. In addition to the usual firm name, product, use, and trade name indices, there are also a functional index of chemicals and a special list giving brief descriptions of new chemicals announced after July 1, 1951.

"Ace Hard Rubber & Plastics Handbook." American Hard Rubber Co., New York, N. Y. 100th Anniversary Edition. 80 pages. This second edition of the company's handbook is completely rewritten and divided into sections on hard rubber; special hard rubber compounds; impact resistant resin-rubber blends; Ace-Tex pyrobitumen; coverings and linings of hard and soft rubber; and Ace thermoplastic materials. Each section presents comprehensive data on properties, tolerances, and shop practice and shows many typical applications.

"Dandux Belting." C. R. Daniels Inc., Baltimore, Md. 32 pages. Complete descriptions of the company's Dandux stitched canvas belting for use in elevators and conveyers are given in this illustrated catalog. Data include design, construction, specifications, and applications for the different types of belting.

"Methods of Measuring Humidity and Testing Hygrometers." NBS Circular 512. Arnold Wexler and W. G. Brombacher, National Bureau of Standards, United States Department of Commerce. For sale by the Superintendent of Document, U. S. Government Printing Office, Washington 25, D. C. 20 pages. Price, \$0.15. This paper reviews methods for measuring moisture vapor content of air and other gases and for producing and controlling atmospheres of known humidity. Various hygrometric techniques are also discussed together with suitable equipment, and a list of 157 literature references is included.

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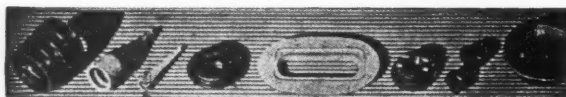
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"G-E Electrical Insulating Materials." Bulletin CDL-35. General Electric Co., Pittsfield, Mass. 8 pages. Information is given on the properties and applications of the company's various types of electric insulating materials, including varnishes, Glyptal alkyd finishes, varnished cloth and tapes, sealing and filling compounds, silicone resins, silicone bonded mica-glass cloth sheets, silicone varnished glass and glass-mica cloths and tapes, and mica insulation.

"Hercules Dresinol." Hercules Powder Co., Wilmington, Del. 4 pages. Revised information on the company's series of Dresinol resin emulsions is available in this new leaflet. Properties of the 10 emulsions appear together with brief information on their use as modifiers for synthetic rubber and resin latices; adhesives; paints and coatings; sizings; fabric finishes; and binders for fibrous and inorganic materials.

"Tlargo Yearbook, 1952." Volume XI. The Los Angeles Rubber Groups, Inc., Mayfair Hotel, Los Angeles 14, Calif. 84 pages. This handsome, illustrated yearbook commemorates the Group's twenty-fifth anniversary. Contents include the Group's officers, directors, and committees; a history of the Group; descriptions of the Group's activities and meetings during 1951; a list of suppliers to the rubber industry; membership roster; Pacific Coast rubber manufacturers and principal products; and, as the technical feature, an extensive table on the chemical resistance of rubbers and plastics.

"Monoplex S-71." Rohm & Haas Co., Philadelphia, Pa. 8 pages. This bulletin describes a new monomeric ester-type plasticizer for vinyl compounds that also has significant stabilizing properties. Information includes properties, performance in blends with other types of plasticizers, stability in vinyl compounds, compatibility, and use in vinyl plastisols.

"Plasticizers—Paraplex, Monoplex." 48 pages. Using many tables and diagrams, this booklet presents extensive data on the nature of Monoplex and Paraplex plasticizers, their chemical and physical properties, performance characteristics, evaluation techniques, and applications in vinyls.

"Burundum, the Tubular Grinding Medium." U. S. Stoneware Co., Akron, O. 4 pages. This bulletin describes and illustrates the uses of Burundum tubular ceramic bodies as grinding media in ball and pebble mills.

"Motor Truck Facts." 1951 Edition. Automobile Manufacturers Association, New Center Bldg., Detroit 2, Mich. 56 pages. Publications of Underwriters Laboratories, Inc., 207 E. Ohio St., Chicago 11, Ill. "Gas and Oil Equipment List." November, 1951. 240 pages. "Bi-Monthly Supplement to All Lists." October, 1951. 83 pages. December, 1951. 80 pages. "Uses of Persulfates—A Bibliography." Bulletin No. 34. Buffalo Electro-Chemical Co., Inc., Buffalo, N. Y. 20 pages.

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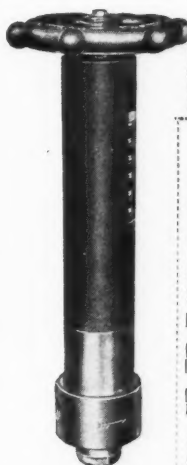
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MARKET REVIEWS

CRUDE RUBBER

EASIER tones, plentiful offerings, and falling prices characterized the foreign natural rubber markets during the period January 16 to February 15. The three factors motivating this price decline were: (1) changes in the GSA buying policy; (2) liquidation of upcountry rubber stocks in Malaya in advance of an additional replanting tax to take effect in March; and (3) devaluation of the Indonesian rupiah which had a bearish effect on the Singapore and London markets.

At the beginning of February, GSA began to reduce its buying price for rubber in a series of steps, corresponding to the market decline. In addition, GSA informed dealers and brokers that it would no longer purchase five of the lower grades of crude rubber, including the No. 4 browns, No. 4 ambers, and flat bark.

The only exception to this ruling is rubber offered by Siam under the buying agreement made with the United States last year. GSA also announced a new "get tough" policy involving an increase in the penalty for late delivery of rubber from 0.5-1¢ per pound per month, a stricter insistence on contract specifications and penalties for failure to meet specifications.

Failure to meet specifications will result in a minimum penalty of 3% on all rejected rubber. Domestic buying agents will have the right to invoice the rubber back to the shipper at the contract price, plus the agent's expenses. Rejected rubber arriving here will be put into escrow, with payment deferred until after GSA quits its exclusive buying role. While the shipper can re-offer the rubber for sale at its newly determined grade, the price will be based on current market value. Besides, the shipper cannot replace the rejected rubber with another shipment that conforms to the specifications of the original contract.

Trade sources saw the increase in the late delivery penalty as an attempt by GSA to hurry up the shipments of current bookings so that licensing for private importation could be planned more carefully. The cutting off of the low-grade rubber purchases was made because the strategic stockpile, reported to be near its goal, already has its quota of the lower grades.

On January 28 it was announced that the United States will buy 25,000 long tons of crude rubber from Britain's stockpile for transfer to the domestic stockpile. The transfer will take place over a few months, with payment to be on the basis of current American buying prices. This arrangement will benefit the sterling areas by providing dollars, and also accelerate the attainment of domestic stockpile goals.

Domestic rubber products manufacturers were reported to have placed orders actively with GSA for their March requirements. Some hesitation in placing April orders is expected because the reductions in the GSA buying prices for rubber in the foreign markets are expected to be reflected by a corresponding cut in the February-March selling price to domestic manufacturers of 50.5¢ for No. 1 smoked sheets. Such a price reduction is expected to be announced about March 15.

On February 4 the NPA removed inventory limits on GR-S under Amendment

1 to Order M-2. The ruling stemmed from an increase in GR-S stocks from 20,000 tons in last June to a current level of about 42,000 tons. Inventory control over GR-S is now limited to the provisions of NPA Regulation 1 which require that inventories be held to a practical minimum working level. The amendment did not change export restrictions, the 30-day inventory limitation on butyl stocks, or the 46% limitation on the amount of cold rubber as compared with regular GR-S which can be purchased from RFC. Smaller rubber manufacturers are now able to buy GR-S in carload lots without working inventories to abnormally low levels, while gaining elimination of extra freight charges on less-than-carload lots.

NOTE: On February 25 the New York Commodity Exchange announced that trading in rubber futures would be resumed on March 3, with the first active delivery month to be September, 1952. This action followed the GSA announcement on February 23 that it was abandoning its role as exclusive purchaser of natural rubber. Details of the GSA announcement appear on page 737.

Latexes

AT THE present rate of absorption, government *Hevea* latex stocks will probably be delivered to private buyers by May 1, with actual liquidation by contract completed by March 1, according to Arthur Nolan, Latex & Rubber, Inc., writing in the February *Natural Rubber News*. To provide latex when these stocks are exhausted, GSA is expected to authorize recognized importers to ship latex from the Far East starting some time in February and from Liberia starting in March. Such authorizations for import will prohibit use, sales, or transfer of the latex prior to GSA release after liquidation of the government's position.

Since these circumstances make the final completion of a sale of "free" latex indeterminate, producers and importers of latex have been encountering difficulty in establishing selling methods that would be fair to both parties. Several methods have been announced which link latex prices to the price of No. 1 smoked sheet. These methods offer buyers an opportunity for an assured supply of fixed quantities of known qualities of latex for forward or future delivery, and an opportunity to fix costs at once or at a later time, as desired.

The announced methods follow: (A) contract for fixed quantities to be delivered during specified periods, with the price to be established by adding a negotiated differential to the average f.o.b. Singapore quotation for No. 1 sheets for the third month preceding the month of arrival in the United States; (B) contract for fixed quantities to be delivered during specified periods, with the price to be fixed any time prior to arrival by adding a negotiated differential plus the costs of hedging to the Singapore price for No. 1 sheets; (C) contract for fixed quantities and fixed deliveries at fixed prices by bids and offers exchanged between buyer and seller; and (D) procurement of "spot" lots of latex from stocks which might be available in the United States.

The GSA selling price to domestic

consumers for February-March deliveries of concentrated *Hevea* latex in tank car quantities is 62.5¢ per pound solids. The April delivery price is expected to be appreciably lower, since it will be based on a 12¢ per pound solids differential over the April price for No. 1 smoked sheets which will be reduced from its current level.

Estimated December figures for *Hevea* latex are: imports, 1,500 long tons, dry weight; consumption, 3,200 long tons; and month-end stock, 4,800 long tons. GR-S latex estimates for December show a production of 2,720 long tons, dry weight; imports, 100 long tons; consumption, 2,700 long tons; and month-end stocks 4,000 long tons.

SCRAP RUBBER

THE scrap rubber market remained in the doldrums during the period from January 16 to February 15. Only very limited orders were placed, and what little business was done was virtually confined to tires. Reclaimers have been buying sparingly for replacement needs only. While tire scrap supplies are fairly satisfactory, supplies are said to be piling up in outlying areas because of high freight rates and soakings by snow and rain.

The situation was even worse in scrap tubes, with virtually no outlets anywhere except for restricted quantities of butyl tubes. The slackness of the scrap rubber market was reflected by lower prices and nominal quotations for many grades. If and when the reclaimers actually return to the market within the next few months, the outlook is that any purchases of scrap they make will be at even lower prices than those currently quoted.

OPS ceiling prices for scrap rubber were given in our September issue, page 756. Following are dealers' actual selling prices for scrap rubber, in carload lots, delivered to mills at the points indicated:

	Eastern Points	Akron, O.
	(Per Net Ton)	
Mixed auto tires.....	\$17.50	\$19.00
S. A. G. auto tires.....	Nom.	Nom.
Truck tires.....	Nom.	19.00
Peelings, No. 1.....	Nom.	55.00
2.....	Nom.	29.00
3.....	Nom.	27.00
	(\$ per Lb.)	
Auto tubes, mixed.....	4.0	4.0
Black.....	5.5	5.5
Red.....	8.5	8.75
Butyl.....	3.0	3.0

RECLAIMED RUBBER

NO CHANGE occurred in the dull reclaimed rubber market picture from January 16 to February 15. In view of the general slowness throughout the rubber goods manufacturing industry, the immediate outlook for a pick-up in reclaim consumption is not bright. As long as reclaim prices remain competitive with those of natural and synthetic rubber,

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the long-term prospects will be satisfactory. Meanwhile reclaimers are operating well below capacity and awaiting further market developments.

Final November and preliminary December statistics on the domestic reclaimed rubber industry are now available. Final November figures gave a production of 25,453 long tons; imports, 60 long tons; consumption, 24,509 long tons; exports 984 long tons; and month-end stocks, 44,049 long tons. Preliminary figures for December show a production of 23,874 long tons; consumption, 22,380 long tons; exports, 1,245 long tons; and month-end stocks, 46,171 long tons.

No changes were made in reclaimed rubber market prices during the period, and prices were generally at the OPS ceilings listed in our September issue page 756.

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE
WEEK-END CLOSING PRICES

	Dec. 29	Jan. 19	Jan. 26	Feb. 2	Feb. 9	Feb. 16
Futures						
May	41.76	41.48	41.66	41.75	40.39	39.24
July	41.20	41.05	41.28	41.08	39.50	38.67
Oct.	38.85	38.54	38.82	38.27	37.12	36.42
Dec.	38.30	38.25	38.49	37.97	36.90	36.20
Mar.	38.18	38.12	38.35	37.82	36.77	36.08
May	38.05	37.99	38.15	37.60	36.70	35.92

AFTER fluctuating irregularly, cotton prices on the New York Cotton Exchange broke sharply at the end of the period January 16-February 15. Market conditions were generally uneasy throughout the period as the result of discouraging reports from the textile mills. Toward mid-February prices dipped sharply with reports from mills of possible further production curtailments and reports from Washington of a possible curtailment in military procurement starting July 1 of as much as 30% in view of the more optimistic Korean outlook.

The news that the United States Department of Agriculture was opposed to any increase in the cotton support level had little immediate effect on the market. Trade observers, however, believe that continuing the present support level will mean a reduction in cotton acreage below the government output aim of 16,000,000 bales. The long-range outlook, therefore, is considered to be potentially bullish.

The spot price for 15/16-inch middling cotton opened the period at 43.05¢, reached a high of 43.20¢ on January 21, was quoted at 43.05¢ on February 1, and fell to a low of 41.00¢ on February 15.

Fabrics

Demand for cotton gray goods continued dull during the period from January 16 to February 15, with most business confined to small fill-in lots. Softening prices were noted in many constructions, and it was said that most mills were selling at below-quoted prices for moderate-size orders. Wide drills were almost at a complete standstill, and it was reported that some mills have taken their looms off these fabrics. Trading in sateens, twills, and headlinings was scattered. Chafers and hose and belting fabrics continued to sell at list prices for delivery in 30-60 days, and good demand was also evident for numbered ducks used in government contracts.

Sheeting demand was almost non-exis-

tent, and two sheeting mills shut down indefinitely as a result of low prices and inability to make sales. Other sheeting mills were said to have curtailed production sharply during recent weeks and to be working three to four days a week on a two-shift basis.

Cotton Fabrics

Drills	
59-inch 1.85-yd.	yd. \$0.37 / \$0.375
2.25-yd.	.32 / .33

Ducks	
38-inch 1.78-yd S. F.	yd. .437½
2.00-yd. D. F.	.40
51.5-inch, 1.35-yd. S. F.	.3775
Hose and belting	.80

Osnaburgs	
40-inch 2.11-yd.	yd. .28
3.65-yd.	.1725

Raincoat Fabrics	
Print cloth, 38½-inch, 64x60	yd. .1475 / .15
Sheeting, 48-inch, 4.17-yd.	nom.
52-inch 3.85-yd.	nom.

Chafers Fabrics	
14-oz./sq. yd. Pl.	lb. .85
11.65-oz./sq. yd. S.	.78
10.80-oz./sq. yd. S.	.82
8.9-oz./sq. yd. S.	.835

Other Fabrics	
Headlining, 68-inch 1.35-yd., 2-ply.	yd. nom.
64-inch, 1.25-yd. 2-ply.	.69
Sateens, 53-inch 1.32-yd.	.64 / .6575
58-inch 1.21-yd.	.69 / .7175

Tire Cords	
K. P. std., 12-3-3	lb. nom.
12-4-9	.90

RAYON

VISCOSE high-tenacity rayon yarn production during the fourth quarter of 1951 amounted to 89,900,000 pounds, an increase of 5,000,000 pounds over the third-quarter figure. Total 1951 production of this yarn was 332,800,000 pounds, a new high and 8% above the 1950 total. The average denier of the high-tenacity viscose yarn was 1,564 in 1951, as compared to 1,554 in 1950. Total shipments of rayon yarn during 1951 for use in tires and related products amounted to 324,400,000 pounds, also a new high, with an average denier of 1,570.

Rayon tire cord will be in tight supply until 1955 at least, according to a leading tire manufacturer. Tire industry consumption of rayon cord is estimated at 550,000,000 pounds in the foreseeable future. Only 375,000,000-400,000,000 pounds are

expected to be available for industry consumption in 1952, and it is doubtful that rayon cord producers can increase their output to the 550,000,000 pound mark until late 1955. According to this manufacturer, tire cord, and particularly the more desirable high-tenacity rayon cord, is rapidly becoming the major raw material supply problem of the tire industry.

There were no changes in rayon tire yarn and fabric prices during the period from January 16 to February 15, and current prices follow:

Rayon Prices

Tire Fabrics	
1100/490/2	80.695 / \$0.72
1650/980/2	.73
2200/980/2	.685

Tire Yarns	
1100/480	.62 / .63
1100/490	.62
1150/490	.62
1650/720	.61 / .62
1650/980	.61
1900/980	.61
2200/960	.61
200/980	.60
400/2034	.66

SPE Sections

(Continued from page 725)

ship of the Mutual Security Agency. The team leader, A. L. Sparshott, Witton Moulded Insulation Works, Ltd., spoke briefly on the aims of the mission. W. M. Cox, Chelsea Vocational High School, also spoke on the course in plastics fabricating being given at Chelsea and urged the active cooperation of the local plastics industry in establishing a more comprehensive vocational course of study in plastics technology.

Table favors were distributed through the courtesy of Dow and Amalite, Inc., and the meeting closed with a drawing for door prizes contributed by Baby World, Inc., Brillhart Plastics, Inc., Celanese Corp. of America, and Wess Plastic Molds, Inc.

Miami Valley Section Elects

The following officers of the Miami Valley Section have been announced for 1952: president, Merle F. Nelson, Plastic Moldings Corp.; vice president, Charles M. Selz, Kurz-Kasch, Inc.; secretary, Ralph N. Backscheider, Recto Molded Products, Inc.; and treasurer, Paul A. MacPhee, National Cash Register Co. The following committee chairmen have been appointed: program, Martin H. Kasch, Kurz-Kasch, and Richard W. Bice, Formica Co.; credentials, Carl E. Weber, Crosley Division, Avco Mfg. Corp.; membership, John W. Brierley, Bakelite Corp.; fellowship, Marvin L. Winemiller, Recto; technical activities, Byron W. Nelson, National Cash Register; publicity, John L. Russell, National Cash Register; and national director, Walter F. Oelman, Standard Molding Corp.

The Section held its first regular dinner-meeting of the year on January 10 at the Crosley plant in Cincinnati, O. Some 64 members and guests heard Jack Paton, E. I. du Pont de Nemours & Co., Inc., speak on "Molded Nylon, an Engineering Material." The February 7 meeting consisted of a tour through the McCall Publishing Co. plant at Dayton, O., with 49 members and guests participating. Tour guides were John Whitlock (personnel), Charles Wolfe (production), Homer Skidmore (pre-press), and Jack Corbin (engineering), of the McCall firm.





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Eagle-Picher manufactures a comprehensive line of both lead and zinc pigments for the rubber industry. The quality and uniformity of our pigments, exact quality control methods of manufacturing, more than a century of experience . . . are the factors that make Eagle-Picher *serve you better*.

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Abrasives		
Pumicestone, powdered...lb.	\$0.025	\$0.055
Rottenstone, domestic...lb.	40.00	48.00

Accelerators, Organic		
A-10.....lb.	.40	.47
A-19.....lb.	.52	.58
A-77.....lb.	.59	.69
A-32.....lb.	.47	.60
A-100.....lb.	.47	.60
Accelerator S.....lb.	.98	
49.....lb.	.48	.49
552.....lb.	2.00	
808.....lb.	.59	.61
833.....lb.	1.13	1.15
Altax.....lb.	.42	.44
Rodform.....lb.	.425	.44
Amaz.....lb.	1.00	
Azate.....lb.	2.16	
Beutene.....lb.	.59	.64
B-J-F.....lb.	.27	.32
Butasan.....lb.	1.00	
Butazate.....lb.	1.00	
Butyl Eight.....lb.	1.10	1.35
Zimate.....lb.	1.00	
Captax.....lb.	.34	.36
C-P-B.....lb.	1.95	
Cumate.....lb.	1.45	
Cuprax.....lb.	.60	.62
Diesterex N.....lb.	.50	.57
DOTG(diorthotolylguanidine).....lb.	.52	.53
DPG(diphenylguanidine).....lb.	.42	.45
EL-Sixty.....lb.	.61	.68
Ethasan.....lb.	1.00	
Ethazate.....lb.	1.00	
Ethex.....lb.	1.00	
Ethyl Tuads.....lb.	1.00	
Zimate.....lb.	1.00	
Ethylac.....lb.	.88	.90
Good-rite Erie.....lb.	.35	.37
Hepteen.....lb.	.42	.48
Base.....lb.	1.80	1.90
Ledate.....lb.	1.00	
M-B-T.....lb.	.34	.39
XXX.....lb.	.46	.48
M-B-T-S.....lb.	.42	.47
Pellets.....lb.	.425	.445
Mertax.....lb.	.50	.57
Methasan.....lb.	1.00	
Methazate.....lb.	1.00	
Methyl Tuads.....lb.	1.10	
Zimate.....lb.	1.00	
Monex.....lb.	1.10	
Mono-Thiurad.....lb.	1.10	
Mortex.....lb.	.59	.64
NOBS No. 1.....lb.	.68	.70
O-X-A-F.....lb.	.43	.48
Pentex.....lb.	1.00	
Flour.....lb.	.20	
Phenex.....lb.	.49	.54
Pipazate.....lb.	1.53	
Rodform products.....lb.	1.00	3.00
Rotax.....lb.	.44	.46
S. A. 52.....lb.	1.10	
57, 62, 67, 77.....lb.	1.00	
Safex.....lb.	1.15	
Santocure.....lb.	.68	.75
Selenac.....lb.	1.45	
SPDX-GH.....lb.	.64	.69
Tellurac.....lb.	1.45	
Tepidone.....lb.	.55	
Tetrona A.....lb.	1.85	
Thiofide.....lb.	.42	.49
S.....lb.	4.65	.535
Thionex.....lb.	1.10	
Thiotax.....lb.	.34	.41
Thiurad.....lb.	1.10	
Thiuram E.....lb.	1.00	
M.....lb.	1.10	
Trimene.....lb.	.54	.64
Base.....lb.	1.03	1.18
Tuex.....lb.	1.10	
2-MT.....lb.	.75	
Ultex.....lb.	1.00	1.10
Ureka Base.....lb.	.66	.73
Z-B-X.....lb.	2.45	
Zenite.....lb.	.42	.44
A.....lb.	.50	.52
Special.....lb.	.43	.45
Zetax.....lb.	.43	.45

Accelerator-Activators, Inorganic		
Lime hydrated.....lb.	9.00	16.00
Litharge, comml.....lb.	.2065	.2165
Eagle, sublimed.....lb.	.2165	.2175
National Lead.....lb.	.2165	.2175
Red lead, comml.....lb.	.2155	.2307
Eagle.....lb.	.2275	
National Lead.....lb.	.2255	
White lead, basic.....lb.	.201	.211
Eagle, National Lead.....lb.	.201	.2111
White lead, silicate.....lb.	.1715	.2371
Eagle.....lb.	.2204	.2371
National Lead.....lb.	.1715	.1815
Zinc oxide, comml.....lb.	.176	.2085

Accelerator-Activators, Organic		
Akton.....lb.	.22	.23

Barak.....lb.	\$0.60	
Curade.....lb.	.57	\$0.59
D-B-A.....lb.	1.95	
Delac P.....lb.	.45	.52
Emersol 110.....lb.	.105	.1175
120.....lb.	.11	.1225
130.....lb.	.1325	.145
210 Elaine.....lb.	.11	.1375
Emery 600.....lb.	.09	.1175
Guantal.....lb.	.55	.62
Hyfac 430.....lb.	.17	.1825
431.....lb.	.18	.1925
Laurex.....lb.	.29	.32
MODX-B.....lb.	.295	.345
NA-22.....lb.	1.50	
Palmalene.....lb.	.35	
Polyac.....lb.	.27	.30
Ridact.....lb.	1.60	
Seedine.....lb.	.1485	.1705
SOAC-KL.....lb.	.065	.09
Stearax Beads.....lb.	.1475	.1575
Stearic acid, single pressed.....lb.	.105	.1175
Double pressed.....lb.	.11	.1225
Triple pressed.....lb.	.1325	.145
Stearite.....lb.	.095	.10
Tonox.....lb.	.50	.59
Zinc stearate.....lb.	.37	.39

Alkalies		
Caustic soda, flake.....100 lbs.	3.75	6.77
Liquid, 50%.....100 lbs.	2.55	2.75
Solid.....100 lbs.	3.35	5.05

Antioxidants		
AgeRite Alba.....lb.	2.20	2.30
Gel.....lb.	.60	.62
H.P.....lb.	.67	.69
Hipar.....lb.	.91	.93
Powder.....lb.	.49	.51
Resin.....lb.	.65	.67
D.....lb.	.49	.51
White.....lb.	.49	.51
White.....lb.	1.40	1.50
Akroflex C, F.....lb.	.67	.69
Albasan.....lb.	.69	.73
Aminox.....lb.	.49	.58
Antioxidant 2246.....lb.	1.60	1.63
Antisol.....lb.	.23	.24
Antox.....lb.	.49	.51
Aranox.....lb.	3.25	
Betanox Special.....lb.	.70	.79
B-L-E, -25.....lb.	.49	.58
Burgess Antisun Wax.....lb.	.21	.52
B-X-A.....lb.	.43	
Copper Inhibitor X-872-L.....lb.	1.95	
Flectol H.....lb.	.49	.56
Flexamine.....lb.	.67	.76
Heliozone.....lb.	.25	.26
Ionol.....lb.	.91	1.40
NBC.....lb.	1.50	
Neozone A.....lb.	.51	.53
C.....lb.	.67	
D.....lb.	.45	.51
Perfectol.....lb.	1.61	.68
Permalux.....lb.	.52	.54
Rio Resin.....lb.	.67	.74
Santoflex 35.....lb.	.75	.82
A.W.....lb.	.49	.56
BX.....lb.	.60	.67
Santovar A.....lb.	1.50	1.57
O.....lb.	1.30	1.37
Santowhite Crystals.....lb.	1.55	1.62
L.....lb.	.49	.56
M.K.....lb.	1.25	1.32
S.C.R.....lb.	.32	.34
Sharplex.....lb.	.25	.28
Stabilite.....lb.	.53	.57
Alba.....lb.	.72	.79
L.....lb.	.60	.64
White.....lb.	.53	.62
Powder.....lb.	.41	.47
Sunolite.....lb.	.20	
Sunproof.....lb.	.25	.30
Improved.....lb.	.23	.28
Jr.....lb.	.18	.23
Thermoflex A.....lb.	.98	1.00
Tonox.....lb.	.50	.5975
Tysonite.....lb.	.24	.24
V-G-B.....lb.	.65	.74
Wing-Stay S.....lb.	.49	.58
Zenite.....lb.	.33	.35

Antiseptics		
Copper naphthenate, 6-8% lb.....lb.	.2475	
Pentachlorophenol.....lb.	.21	.29
Resorcinol, technical.....lb.	.825	.835
Zinc naphthenate, 8-10% lb.....lb.	.235	.285

Blowing Agents		
Ammonium bicarbonate.....lb.	.06	.07
Carbonate.....lb.	.23	.24

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of all known ingredients. Prices are not guaranteed; contact suppliers for spot prices.
†For trade names, see Color—White, Zinc Oxide.

Sodium bicarbonate, 100 lbs.....lb.	\$2.10	\$3.15
Carbonate, technical 100 lbs.....lb.	1.20	5.02
Unicel.....lb.	.82	
ND.....lb.	1.40	
S.....lb.	.20	

Bonding Agents		
BAC Latex.....lb.	.75	.80
G-E Silicone Paste SS-15.....lb.	4.52	5.10
SS-64.....lb.	3.65	6.75
-67 Primer.....lb.	7.50	12.50
MDI-50.....lb.	2.75	3.25
Thixons.....gal.	1.48	12.00
Ty-Ply BN, Q, S, 3640.....gal.	6.75	8.00

Brake Lining Saturants		
B.R.T. No. 3.....lb.	.024	.025
Resinex L-S.....lb.	.0225	.03

Carbon Blacks		
Conductive Channel-CC		
Continental R-20.....lb.	.15	.22
R-40.....lb.	.18	.24
Kosmos/Dixie BB.....lb.	.195	.25
Spheron C.....lb.	.14	.185
N.....lb.	.25	.30
Voltex.....lb.	.18	.315

Easy Processing Channel-EPC		
Continental AA.....lb.	.074	.1225
Kosmobile 77/Dixiedensed.....lb.	.07	.1225
77.....lb.	.07	.1225
Micronex W-6.....lb.	.074	.1225
Spheron #9.....lb.	.074	.1225
Texas E.....lb.	.07	.1175
Witco #12.....lb.	.074	.1225
Wyex.....lb.	.07	.12

Hard Processing Channel-HPC		
Continental F.....lb.	.074	.1225
HX.....lb.	.074	.12
Kosmobile S/Dixiedensed S.....lb.	.07	.1225
Micronex Mk. II.....lb.	.07	.1225
Spheron #4.....lb.	.074	.1225
Witco #6.....lb.	.074	.1225

Medium Processing Channel-MPC		
Arrow TX.....lb.	.07	.12
Continental A.....lb.	.074	.1225
Kosmobile S-66/Dixiedensed.....lb.	.07	.1225
S-66.....lb.	.07	.1225
Micronex Standard.....lb.	.074	.1225
Spheron #6.....lb.	.074	.1225
Texas M.....lb.	.07	.1175
Witco #1.....lb.	.074	.1225

Fast Extruding Furnace-FEF		
Arovel.....lb.	.06	.10
Kosmos 50/Dixie 50.....lb.	.0575	.10
Statex M.....lb.	.0575	.10
Sterling SO.....lb.	.06	.10

Fine Furnace-FF		
Statex B.....lb.	.0625	.105
Sterling 99.....lb.	.065	.105

High Abrasion Furnace-HAF		
Aromex.....lb.	.075	.125
Continec HAF.....lb.	.079	.125
Kosmos 60/Dixie 60.....lb.	.074	.1175
Philblack O.....lb.	.075	.119
Statex R.....lb.	.075	.125
Vulcan #3.....lb.	.079	.122

Medium Abrasion Furnace-MAF		
Philblack A.....lb.	.0575	.10

General-Purpose Furnace-GPF		
Sterling V.....lb.	.05	.09

High Modulus Furnace-HMF		
Continec HMF.....lb.	.055	.095
Essex.....lb.	.0375	.08
Furnex.....lb.	.0375	.08
Gastex.....lb.	.045	.085
Kosmos 20/Dixie 20.....lb.	.0375	.08
Pelletex.....lb.	.04	.08
Sterling NS, S.....lb.	.04	.08

Semi-Reinforcing Furnace-SRF		
Continec SRF.....lb.	.04	.08
Essex.....lb.	.0375	.08
Furnex.....lb.	.0375	.08
Gastex.....lb.	.045	.085
Kosmos 20/Dixie 20.....lb.	.0375	.08
Pelletex.....lb.	.04	.08
Sterling NS, S.....lb.	.04	.08

Fine Thermal-FT		
P-33.....lb.	.055	

Medium Thermal-MT		
Thermax.....lb.	.035	
Stainless.....lb.	.045	

Chemical Stabilizers		
Advastab -21.....lb.	1.06	1.12
Argus Stabilizers.....lb.	.60	1.10

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RUBBER TECHNICIAN (ENGINEER) 48 YEARS' OLD, 23 YEARS' experience in Germany, England, United States, at present working in Norway, seeks responsible position abroad. Offer: thorough knowledge building and designing automobile, truck, and cycle tires. Up-to-date calendaring methods; own machine designs; development of factory plans. Languages: German, English. Address Box No. 979, care of INDIA RUBBER WORLD.

WANTED: POSITION AS FACTORY SUPERINTENDENT OR developing engineer. Have had 20 years' experience in developing new equipment for labor-saving devices and have originated new articles made of rubber. My experience consists of the following lines: rubber tiling, molded goods of all description, open heat cures, plaster-cast mold construction, rubber rolls for the paper industry, and many other articles. Have been granted several patents on the above-mentioned materials. If you want the know-how. Address Box No. 980, care of INDIA RUBBER WORLD.

RUBBER AND PLASTICS CHEMIST, 30, SWISS, FEMALE, varied experience in development work (special compounds) as in manufacturing on most technical rubber and plastic goods, 3 languages, available for June. Address Box No. 981, care of INDIA RUBBER WORLD.

CHEMIST-COMPOUNDER-DEVELOPMENT ENGINEER, FOURTEEN years' experience on tires and tubes of all types. Five years on various other products. Address Box No. 989, care of INDIA RUBBER WORLD.

COMPLETE ENGINEERING SERVICE ON FOAM RUBBER plants available. Address Box No. 991, care of INDIA RUBBER WORLD.

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RUBBER TECHNICIAN: NORTH CAROLINA BRANCH PLANT of a nationally known concern has opening in Technical Department for a chemical engineer with three to five years' experience in development and manufacture of mechanical goods. Must know compounding and factory processing. Work involves responsibility for quality control and comprehensive reporting of laboratory results. Good opportunity for progress upon demonstration of ability. Excellent living conditions. Outline personal history, education, and experience. Indicate salary required. Address Box No. 982, care of INDIA RUBBER WORLD.

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Excellent opportunity for a plastics technician with a national rubber corporation.

Assignment in Montevideo, Uruguay. Must have manufacturing experience in plastic molding, injection, and plastic sheeting.

Please forward complete résumé stating educational background, experience, and salary expected.

Address Box 978, c/o INDIA RUBBER WORLD.

EXPERIENCED LATEX CHEMIST FOR NATURAL LATEX COMPOUNDS. Good salary with excellent future depending upon one's ability to produce and fit into our organization. Give résumé in first letter on experience and technical background. Our technical staff knows of this ad. Replies held confidential. Address Box No. 983, care of INDIA RUBBER WORLD.

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RUBBER CHEMIST: THREE TO FIVE YEARS' LABORATORY or factory experience sole and heel industry or mechanical goods. Send complete résumé. Salary open. Our employees know of this ad. Address Box No. 984, care of INDIA RUBBER WORLD.

CHEMIST WITH BROAD KNOWLEDGE OF RUBBER INDUSTRY for technical raw material sales covering midwestern states only. Excellent opportunity for advancement. State full particulars including age, education, experience, and essential details. Address Box No. 985, care of INDIA RUBBER WORLD.

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ADHESIVES CHEMIST: TO WORK EXCLUSIVELY IN RESEARCH and development of adhesives in laboratory of progressive Midwest compounding company. Experience in natural and various latices required. Ability to work independently of prime importance. Reply in confidence giving details of academic and professional experience, salary range desired, and age. Address Box No. 990, care of INDIA RUBBER WORLD.

ENGINEER—TOOL DESIGN CHEMICAL ENGINEER—PLASTICS CABLE DESIGN ENGINEER TEST ENGINEER

Experience in rubber and plastic insulated wire and cable required. In reply give full résumé of education and salary requirements to WHITNEY BLAKE COMPANY, 1565 Dixwell Avenue, Hamden 14, Conn.

RUBBER PRODUCT DEVELOPMENT ENGINEER: MOLDED, rubber-to-metal adhesion and extruded products for industrial and automotive field. Must have minimum of five years' experience. Medium-size, progressive plant located in northern Ohio in good hunting and fishing area. Employee benefits, paid vacations, etc. Excellent opportunity. Send complete detailed background résumé and salary requirement. Address Box No. 993, care of INDIA RUBBER WORLD.

NEED EXPERIENCED RUBBER MAN FAMILIAR WITH ALL phases of rubber roll covering for paper mills, etc. Write giving education, experience, salary expected. Address Box No. 994, care of INDIA RUBBER WORLD.

TECHNICAL REPRESENTATIVE WANTED

Progressive chemical supplier has opening for personable individual having 3 to 5 years' rubber compounding and processing experience. Give résumé of education, experience, salary expected, and enclose inexpensive photo. Replies kept strictly confidential. Address Box No. 996, care of INDIA RUBBER WORLD.

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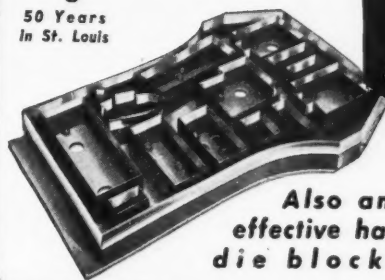
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ALL STEEL, ALL WELDED CONSTRUCTION, with
forged steel hubs for 1¼", 1½" and 2" square bars.
4", 5", 6", 8", 10", 12", 15", 20" and 24" diameters.
Any length. Also Special Trucks (Leaf Type) Racks,
Tables and Jigs.

Used in manufacturing rubber and plastic products.

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CADIZ, OHIO

NEW and REBUILT MACHINERY

Since 1891

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Los Angeles, Calif.

GUARANTEED REBUILT MACHINERY

IMMEDIATE DELIVERIES FROM STOCK

MILLS, CALENDERS, TUBERS
VULCANIZERS, ACCUMULATORS



HYD. PRESSES, PUMPS, MIXERS
CUTTING MACHINES, PULVERIZERS

UNITED RUBBER MACHINERY EXCHANGE

183-189 ORATON ST.

CABLE "URME"

NEWARK 4, N. J.

Rubber-Glo.....gal.	\$0.94	\$0.97
Soap, Hawkeye.....lb.	1.35	1.45
Purity.....lb.	1.35	1.65
Sodium stearate.....lb.	.43	.44
Stearite.....lb.	.095	.10
Vanfre.....gal.	2.50	3.00

Odorants

Alamasks.....lb.	.75	6.50
Curodex 19.....lb.	4.75	
188.....lb.	5.75	
198.....lb.	6.75	
Rodo No. 0.....lb.	4.00	4.50
No. 10.....lb.	5.00	5.50

Plasticizers and Softeners

Akroflex C.....lb.	.61	.63
Aro Lene #1980.....lb.	.10	.12
Baker AA Oil.....lb.	.3375	.3975
Crystal O Oil.....lb.	.3525	.4125
Processed oils.....lb.	.3575	.3925
Bardol.....lb.	0.025	0.035
639.....lb.	.025	.0425
B.....lb.	.0575	.06
Bondogen.....lb.	.55	.60
BRC 20.....lb.	.015	.016
30.....lb.	.0115	.02
521.....lb.	.019	.02
B. R. H. No. 2.....lb.	.02	.029
R. R. S. 700.....lb.	.0175	.026
B. R. T. No. 7.....lb.	.0265	.0275
B. R. V.....lb.	.035	.0515
Bunarex Liquid.....lb.	0.025	0.055
Resins.....lb.	.065	1.225
Bunnatol G. S.....lb.	.40	.505
Butac.....lb.	.125	.135
BRDC.....lb.	.40	.41
Cabflex DI-BA.....lb.	.42	.4475
-OA.....lb.	.435	.4625
-OP.....lb.	.40	.4275
Carbonex.....lb.	.0325	.0375
664.....lb.	.0375	.0425
645.....lb.	.036	.0385
S.....lb.	.0425	.0475
S Plastic.....lb.	.041	.046
Chlorowax 40.....lb.	.16	.17
Contogums.....lb.	.0875	.111
Cumar EX.....lb.	.0525	
MH.....lb.	.065	.11
V.....lb.	.0975	.1275
Dielec B.....lb.	.06	
Dipolymer Oil.....gal.	.33	.38
Dispersing Oil No. 10.....lb.	.055	.0575
Dutrex C-50 LV, 100%.....lb.	.25	.295
Dutrex 6.....lb.	.025	.035
Galex W-100.....lb.	.135	.1725
W-100D.....lb.	.1325	.17
Gilowax B.....lb.	.09	.11
Good-rite GP-261.....lb.	.40	.52
GP-263.....lb.	.45	.585
Harflex 500.....lb.	.45	.4775
Heavy Resin Oil.....lb.	.0225	.0375
Hercolyn.....lb.	.1112	.1347
HSC-13.....lb.	.27	.30
Indonex.....gal.	.11	.19
Morflex 100, 110.....lb.	.425	.4525
200, 210.....lb.	.7775	.805
Nebony resins.....lb.	.04	.045
Nevillac.....lb.	.28	.55
Neville R Resins.....lb.	.13	.35
Nevinol.....lb.	.20	
Nevoll.....lb.	.025	.035
Next resins.....lb.	.11	.48
No. 1-D heavy oil.....lb.	.055	.065
Palmalene.....lb.	.15	
Panaflex BN-1.....lb.	.185	.225
Para Flux, regular.....gal.	.1925	.2125
No. 2016.....gal.	.165	.24
2332.....gal.	.11	
Para Lube.....lb.	.046	.048
Resins.....lb.	.04	.045
Paradene Resins.....lb.	.065	.075
Peptizene #2.....lb.	.90	
Pepton 22.....lb.	.72	.75
Pico Resins.....lb.	.13	.185
480 Oilproof Series.....lb.	.18	.23
S. O. S.....gal.	.29	.34
Piccocizers.....lb.	.04	.068
Piccolastic Resins.....lb.	.1855	.34
Picolylite Resins.....lb.	.185	.25
Piccoumaron Resins.....lb.	.07	.185
Piccovars.....lb.	.145	.20
Piccovol.....lb.	.025	.038
Pictar.....gal.	.25	.30
Pigmentar.....gal.	.041	.0655
Pigmentar oil.....gal.	.041	.0655
Plastender S-1.....lb.	.04	.0425
Plasticizer 35.....lb.	.205	.24
36.....lb.	.305	.34
42.....lb.	.34	.40
B.....lb.	.35	.45
DP-520.....lb.	.435	.455
MT-511.....lb.	.535	.565
ODN.....lb.	.32	.37
PX series.....lb.	.385	.75
SC.....lb.	.61	.69
Plastogen.....lb.	.0775	.08
Plastone.....lb.	.22	.4775
Polycizers.....lb.	.40	
Polyme 6.....lb.	.07	.075
7.....lb.	.14	
D Resin.....lb.	.253	.24
Gilowax B.....lb.	.0925	.1025
Resin C-130.....lb.	.195	.205
PT67 Light Pine Oil.....gal.	.50	.60
101 Pine Tar Oil.....lb.	.041	.0534
400 Light Pine Tar.....lb.	.041	.0534
500 Med. Pine Tar.....lb.	.041	.0534

R-19, R-21 Resins.....lb.	\$0.1075	
Reogen.....lb.	.1325	\$0.135
Resin C pitch.....lb.	.02	.0285
R0-3.....lb.	.38	.40
Resinex.....lb.	.0325	.0375
L-4.....lb.	.0225	.03
Rosin Oil, Sunny South.....gal.	.58	.865
RPA No. 2.....lb.	.75	
No. 3 RO.....lb.	.49	
5.....lb.	.57	
RSN Flux.....gal.	.10	.19
Rubber Oil B-5.....lb.	.0225	.0355
Rubberol.....lb.	.2575	
Santicizer 107.....lb.	.40	.4775
140.....lb.	.3525	.43
141.....lb.	.40	.4775
160.....lb.	.33	.4075
Seedine.....lb.	.1485	.1705
Softener #20.....gal.	.10	.20
Solvenol.....gal.	.50	.61
Special Rubber Resin 100.....lb.	.1675	.2175
Staybelite Resin.....lb.	.125	
Stearex Beads.....lb.	.1474	.1574
Stearite.....lb.	.095	.10
Syn-Tac.....gal.	.33	.35
Synthol.....lb.	.2475	
Thiokol TP-90B.....lb.	.65	
95-98.....lb.	.65	
TR-11.....lb.	.035	
Turgum S.....lb.	.1075	.1175
Tysonite.....lb.	.215	.2225
X-1 Resinous Oil.....lb.	.021	.0275
XX-100 Resin.....lb.	.0525	

Reclaiming Oils

Bardol.....lb.	.025	.035
639.....lb.	.025	.0425
B.....lb.	.0575	.06
B. R. H. No. 2.....lb.	.02	.029
B. R. T. No. 4.....lb.	.0225	.0235
B. R. V.....lb.	.035	.0515
BWH-1.....lb.	.14	.43
Dipolymer Oil.....gal.	.33	.38
Dispersing Oil No. 10.....lb.	.055	.0575
Heavy Resin Oil.....lb.	.0225	.0375
LX-759.....gal.	.16	.169
-774-777.....gal.	.23	.33
No. 1621.....lb.	.025	.035
3186.....gal.	.28	.295
Picco 6535.....gal.	.25	.30
C-33.....gal.	.215	.315
C-42.....gal.	.23	.33
D-4.....gal.	.27	.37
E-5.....gal.	.25	.35
Q-01.....gal.	.286	.36
PT 101 Pine Tar Oil.....lb.	.041	.046
150 Pine Solvent.....gal.	.44	.553
Reclaiming Oil # 3186.....gal.	.28	.385
-G.....gal.	.25	.365
RR-10.....lb.	.35	
S. R. O.....lb.	.015	.0225
Wilcor Nos. 111, 151.....gal.	.26	.30
X-1 Resinous Oil.....lb.	.021	.0275

Reinforcers, Other Than Carbon Black

BRC 20.....lb.	.015	.016
30.....lb.	.0115	.02
521.....lb.	.019	.02
Bunarex resins.....lb.	.065	.1225
Calcene T.M.....ton	75.00	95.00
Calco S. A.....lb.	.85	.88
Carbonex.....lb.	.0325	.0375
644.....lb.	.0375	.0425
645.....lb.	.036	.0385
S.....lb.	.0425	.0475
S Plastic.....lb.	.041	.046
Clays.....lb.		
Aluminum Flake.....ton	23.50	60.00
No. 5.....ton	21.85	36.00
22.....ton	17.00	22.50
Buca.....ton	40.00	
Burgess Iceberg.....ton	50.00	
Pigment No. 20.....ton	35.00	
30.....ton	37.00	
Polyclay.....ton	45.00	
Catalpo.....ton	30.00	
Crown.....ton	14.00	33.00
Dixie.....ton	14.00	
Hydratex R.....ton	28.00	
L. G. B.....ton	17.00	
Paragon (R).....ton	13.50	31.50
Pigment No. 33.....ton	30.00	
Suprex.....ton	14.00	32.00
Witco No. 1.....ton	14.00	30.00
No. 2.....ton	13.50	30.00
Clearcarb.....lb.	.1175	.1225
Cumar EX.....lb.	.0525	
MH.....lb.	.065	.1175
V.....lb.	.0975	.1275
Darex Copolymers.....lb.	.38	.44
G Resin.....lb.	.08	
Good-rite Resin 50.....lb.	.41	.44
Hi-Sil.....lb.	.11	.12
Kralac A.....lb.	.39	.50
Magnesium oxide.....lb.	.05	.34
Marbon resins.....lb.	.41	.48
Multiflex M.M.....ton	110.00	125.00
Neville R Resins.....lb.	.10	.155
Para Resins 2457, 2718.....lb.	.04	.45
Pico Resins.....lb.	.13	.185
Piccolyte Resins.....lb.	.185	.25
Piccoumaron Resins.....lb.	.07	.185
Piccovars.....lb.	.145	.20
Phiolite S-3, -6, -6B.....lb.	.42	.49
S-6C.....lb.	.52	.59
S-Master batches.....lb.	.44	.75
PS-60 Resin.....lb.	.35	
Purecal U.....ton	120.00	135.00

Resin C Pitch.....lb.	\$0.02	\$0.0285
Resinex.....lb.	.0325	.0375
Rubber Resin LM-4.....lb.	.28	.35
S. Polymers.....lb.	.44	
Silene EF.....ton	120.00	140.00
PD.....ton	125.00	145.00
Silvacons.....ton	55.00	85.00
Super Multiflex.....ton	160.00	175.00
Witcarb R.....ton	105.00	120.00
R-12.....ton	45.00	66.00
Zinc oxide, commercial f.....lb.	.176	.2035

Retarders

Cumar RH.....lb.	.105	
Delac J.....lb.	.55	.60
E-S-E-N.....lb.	.36	
Good-rite Vultrol.....lb.	.58	.60
R-17 Resin.....lb.	.1075	
Retarder ASA.....lb.	.55	
TCM.....lb.	.34	.36
W.....lb.	.65	
Retardex.....lb.	.47	.50
RM.....lb.	1.25	
Thionex.....lb.	1.25	

Solvents

2-50-W Hi-Flash Solvent.....gal.	0.41	
3-BX Naphtha.....gal.	.37	
Bondogen.....lb.	.55	0.60
Cosols.....gal.	.37	.48
Dichloro Pentanes.....lb.	.04	.07
Dipentene DD.....gal.	.47	.68
GVL.....lb.	1.00	
LX-572 Oil.....gal.	.27	.32
-H.....lb.	.16	.23
-748 Solvent.....gal.	.16	.23
Penetrell.....gal.	.47	.68
Picco Hi-Solv Solvents.....gal.	.17	.24
Pine Oil D.D.....gal.	.755	.955
PT 150 Pine Solvent.....gal.	.44	.55
Skellysolve-E.....gal.	.153	
-H.....gal.	.133	
-R, -V.....gal.	.109	
-S.....gal.	.099	
Tollac.....gal.	.195	.25

Synthetic Resins

Geon Latex (dry wt.).....lb.	.43	.57
Paste Resins.....lb.	.38	.59
Plastics.....lb.	.42	.77
Polyblend.....lb.	.475	.575
Polyvinyl resins.....lb.	.38	.70
Marvinol VR-10, -20.....lb.	.36	.52

Synthetic Rubbers and Latexes

Chemigum 30N4NS.....lb.	.50	.57
50N4NS.....lb.	.64	.71
N1NS.....lb.	.58	.65
N3NS.....lb.		
Latex (dry wt.).....lb.		
101-A, -AX, -E.....lb.	.32	.41
200.....lb.	.425	.525
235-A, -B.....lb.	.50	.60
245-A, -B.....lb.	.425	.525
G-E Silicone Rubber.....lb.	3.70	4.10
Compound SE-450.....lb.	4.06	4.46
-460.....lb.	5.00	5.50
Gum SE-76.....lb.	.58	.59
Hycar OR-15, -15EP.....lb.	.621	.63
OR-15 Powdered.....lb.	.50	.51
OR-25, -25 EP.....lb.	.51	.52
OR-25 NS.....lb.	.61	.62
OR-25 ST.....lb.	.55	.56
OS-10.....lb.		
Hycar Latex (dry wt.).....lb.	.55	.60
OR-15 types.....lb.	.47	.52
OR-25 types.....lb.		
Neoprene Latex (dry wt.).....lb.		
Type 571, 842, 842-A.....lb.	.35	.46
572, 700.....lb.	.36	.47
601, 601-A.....lb.	.38	.49
735.....lb.	.36	.47
Neoprene Type AC, CG.....lb.	.58	.53
E.....lb.	.65	.68
FR.....lb.	.80	.83
KNR.....lb.	.75	.78
GN, GN-A, S.....lb.	.38	.41
RT, W.....lb.	.40	.43
Paracril 18-80.....lb.	.43	.45
26NS60, 26NS90.....lb.	.44	.46
35NS90.....lb.	.51	.53
Paraplex X-100.....lb.	1.00	
Silastic.....lb.	2.95	4.05
Thiokol LP-2, -3.....lb.	.96	
-8.....lb.	1.25	
PR-1.....lb.	1.95	
Type A.....lb.	.47	
FA.....lb.	.64	
ST.....lb.	1.00	
Thiokol Latex (dry wt.).....lb.		
Type MF.....lb.	.85	
MX.....lb.	.70	
WD-2.....lb.	.92	
-6.....lb.	.70	

Tackifiers

Bunarex resins.....lb.	.065	.1225
Chlorowax 70.....lb.	.18	.19
Contogums.....lb.	.0875	.11
Galex W-100.....lb.	.155	.1925
W-100D.....lb.	1.525	.19
Hercolyn.....lb.	.20	.25
Indopol H-100.....gal.	.85	1.00
H-300.....gal.	1.00	1.16

/\$0.0285
/ .0375
/ .35
/ 140.00
/ 145.00
/ 85.00
/ 175.00
/ 120.00
/ 66.00
/ .2055

MACHINERY AND SUPPLIES WANTED

WANTED—TO EXPEDITE PRODUCTION—RUBBER MAKING machinery including Banbury Mixers, Heavy-Duty Mixers, Calenders, Rubber Rolls & Mixers, Extruders, Grinders & Cutters, Hydraulic Equipment, Rotary and Vacuum Shelf Dryers, Injection Molding Machines. Will consider a set-up plant now operating or shut down. When offering, give full particulars. P. O. Box 1351, Church Street Sta., New York 8, N. Y.

SMALL VULCANIZER 12" TO 18" DIAMETER BY APPROXIMATELY 2 feet long. Tested for 40 lbs. operating pressure. ASSOCIATED RUBBER, INC., Quakertown, Pa.

WE ARE INTERESTED IN PURCHASING ALL TYPES OF RUBBER machinery consisting of mills, Banbury mixers, extruders, calenders, vulcanizers, etc., and also complete plants. Address Box No. 987, care of INDIA RUBBER WORLD.

WANTED: LABORATORY EXTRUDER FOR USE WITH PLASTIC and Rubber. Electrically heated. Must be in good condition. Address Box No. 988, care of INDIA RUBBER WORLD.

ONE STEAMHEATED PRESS—PLATENS 30" X 30" WITH A 14" ram and 24" of daylight. ASSOCIATED RUBBER, INC., Box 61, Quakertown, Pa.

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ESTABLISHED WEST COAST FIRM COVERING CALIFORNIA, with warehouses in San Francisco and Los Angeles, interested in representing firms producing products for rubber, protective coatings, and adhesive industry. Have excellent contacts and technically trained personnel. Best of references. Address Box No. 986, care of INDIA RUBBER WORLD.

RUBBER TECHNOLOGIST WANTS TO ENTER PARTNERSHIP THROUGH investment of capital on a small- or medium-size rubber plant. Address Box No. 995, care of INDIA RUBBER WORLD.

CUSTOM MIXING

We do mixing of compounds of rubber, all types of synthetics, and plastics. Both Banbury and mill mixing capacity are available. Formulation assistance rendered.

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Otto J. Lang, General Mgr.

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Rubber and GRS mixing and plastic compounding and calendering. All work done under careful supervision. Also precision grinding and pulverizing.

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ENTIRE RANGE

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ON REQUEST

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**Mills - Spreaders - Churns
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Rebuilt Machinery for Rubber and Plastics

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HOSE POLES

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All mixing done under careful supervision and laboratory control.

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Cord Latexing, Expanding Mandrels, Automatic Cutting,

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Central Street

QUALITY MOULDS FOR ALL PURPOSES

South Easton, Mass.

THE FIRST STEP—A QUALITY MOULD

Natac.....lb.	\$0.12	/	\$0.13
Nevindene.....lb.	.125	/	.155
Picco resins.....lb.	.13	/	.185
Piccolastic resins.....lb.	.1855	/	.34
Piccolyte resins.....lb.	.185	/	.25
Piccoumaron resins.....lb.	.07	/	.185
Staybelite Resin.....lb.	.06	/	.065
Synthetic 100.....lb.	.41	/	
Synthol.....lb.	.2475	/	
Vistac #1.....lb.	1.00	/	1.16
A.....lb.	.215	/	.2725
P.....lb.	.18	/	.235

Vulcanizing Agents

Dibe 20 G-M-F.....lb.	2.50		
Ethyl Tuads.....lb.	1.00		
G-M-F.....lb.	2.50		
Litharge, commercial.....lb.	.2065	/	.2165
Eagle, sublimed.....lb.	.2165	/	.2175
National Lead.....lb.	.2165	/	.2175
Magnesium oxide.....lb.	.31	/	.3475
Methyl Tuads.....lb.	1.10	/	
Red lead, commercial.....lb.	.2155	/	.2307
Eagle.....lb.	.2257	/	
National Lead.....lb.	.2255	/	
Sulfasun R.....lb.	1.50	/	
Sulfur flour, comml., 100 lbs.....lb.	1.70	/	2.20
Calco.....lb.	2.15	/	7.50
Crystex.....lb.	.195	/	
Insoluble 60.....lb.	.125	/	.13
Rubbermakers.....lb.	2.25	/	3.80
Stauffer.....lb.	.0215	/	.0335
Telloy.....lb.	2.50	/	
Vandex.....lb.	3.50	/	
Vultac Nos. 1, 2.....lb.	.45	/	.47
No. 3.....lb.	.49	/	.51
White lead silicate.....lb.	.1715	/	.2371
Eagle.....lb.	.2204	/	.2371
National Lead.....lb.	.1715	/	.1815

Foreign Trade Opportunities

The firms and industries listed below recently expressed their interests in buying in the United States or in United States representations. Additional information concerning each import or export opportunity, including a World Trade Directory Report, is available to qualified United States firms and may be obtained upon inquiry from the Commercial Intelligence Unit of the United States Department of Commerce, Washington, D. C., or through its field offices, for \$1 each. Interested United States companies should correspond directly with the concerns listed concerning any projected business arrangements.

Export Opportunities

Cesar A. Riguero & Co., Ltd., Apartado Postal 221, Costado Sur Edificio Riguero, Managua, Nicaragua; machinery for recapping tires.
Bernardo Mendel, Carrera 7a No. 12-62, Oficina No. 14, Bogota, Colombia; hospital supplies, automobile accessories.
Industrial Residue Cleaning & Pulverizing Co., Ltd., River Works, River Rd., Barking, Essex, England; waste products including asbestos and rubber.
G. van Loon's Import Maatschappij, N. V., 304-306 Grootestraat, Waalwijk, Netherlands; raw or semi-manufactured plastics (powder, strips, sheets, etc.).
LIMEX—Ligue Importazione Esportazione, S. R. L., 5 Via S. Lorenzo, Genoa, Italy; rubber bathing caps, rubber buoys and safety belts in the form of animals.

U. S. Imports, Exports, and Reexports of Crude and Manufactured Rubber

	October, 1951	
	Quantity	Value
Imports for Consumption of Crude and Manufactured Rubber		
UNMANUFACTURED, Lbs.		
Crude rubber.....	116,143,002	\$49,109,610
Latex.....	6,842,570	3,499,763
Crude chicle.....	156,370	88,006
Guayule.....	461,400	149,590
Balata.....	824,057	383,056
Jelutong or Pontianak.....	308,046	241,246
Gutta percha.....	11,515	6,175
Synthetic rubber.....	1,740,174	398,127
Reclaimed rubber.....	57,060	3,891
Scrap rubber.....	2,680,125	143,289
TOTALS.....	129,221,319	\$54,022,753

MANUFACTURED		
Tires and casings		
Auto, etc.....no.	2,975	\$102,672
Bicycle.....no.	132	239
Other.....no.	45	1,535
Inner tubes: auto, etc.....no.	213	1,717
Rubber footwear		
Boots.....prs.	5,248	15,704
Shoes and overshoes.....prs.	29,846	23,754
Rubber-soled canvas shoes.....prs.	5,544	4,249
Athletic balls: golf.....no.	45,120	12,885
Other, except tennis no.	28,128	1,794
Rubber toys, except balloons.....	34,858	
Hard rubber goods		
Combs.....gr.	13,010	1,296
Sundries.....	325	
Other.....	65,754	
Rubber and cotton packing.....lbs.	2,300	2,913
Packing and gaskets.....lbs.	6,020	
Belting.....lbs.	24,672	46,206
Hose and tubing.....	37,971	3,797
Drug sundries.....	1,949	
Instruments.....doz.	2,348	4,340
Other rubber products.....	1,624	
Gutta percha manufactures.....lbs.	8,490	5,485
Rubber bands.....lbs.	9,478	7,281
Synthetic rubber products.....	303	
Other soft rubber manufactures.....	81,924	
TOTALS.....		\$432,798
GRAND TOTALS, ALL RUBBER IMPORTS.....		\$54,455,551

Exports of Domestic Merchandise

UNMANUFACTURED, Lbs.		
Balata.....	100	\$325
Chicle and chewing gum bases.....	274,703	131,101
Synthetic rubbers		
GR-S type.....	72,801	18,727
Neoprene.....	957,498	382,509
Nitrile type.....	181,778	98,495
Thiokol.....	1,100	614
Polyisobutylene.....	3,830	1,860
Other, except butyl.....	14,244	5,512
Reclaimed rubber.....	2,172,708	193,193
Scrap rubber.....	1,570,893	68,513
TOTALS.....	5,249,655	\$900,849

MANUFACTURED		
Rubber cement.....gals.	63,956	\$117,638
Rubberized fabric		
Auto cloth.....sq. yds.	7,767	9,249
Piece goods and hospital sheeting.....sq. yds.	47,696	51,224
Rubber footwear		
Boots.....prs.	7,012	40,543
Shoes.....prs.	3,383	3,603
Rubber-soled canvas shoes.....prs.	10,558	26,851
Soles.....doz. prs.	7,627	25,742
Heels.....doz. prs.	37,525	46,625
Soling and toplift sheets.....lbs.	162,114	38,866
Gloves and mittens.....doz. prs.	15,570	56,592
Drug sundries		
Water bottles and fountain syringes no.	11,282	7,348
Other.....		131,245
And rubberized clothing		119,108
Toy and novelty balloons.....		28,243
Toys and balls.....		32,936
Erasers, except pencil.....lbs.	10,910	8,873
Hard rubber goods		
Battery boxes.....no.	13,276	26,423
Other electrical.....lbs.	46,475	47,459
Combs, finished.....doz.	2,838	4,286
Other.....		12,607
Tires and casings		
Truck and bus.....no.	67,296	3,476,069
Auto.....no.	62,060	986,918
Aircraft.....no.		77,704
Farm tractor, etc.....no.	5,783	238,897
Other off-the-road.....no.	6,641	1,128,522
Bicycle.....no.	12,375	15,923
Motorcycle.....no.	504	3,222
Other.....no.	2,963	37,318
Inner tubes: auto.....no.	34,573	69,342
Truck and bus.....no.	59,457	287,431
Aircraft.....no.	1,749	8,133
Other.....no.	20,675	54,136
Solid tires: truck and industrial.....no.	2,300	46,856
Tire repair materials		
Camelback.....lbs.	262,320	86,471
Other.....lbs.	219,376	154,176
Rubber and friction tape.....lbs.	28,793	26,833
Belting		
Auto and home.....lbs.	59,773	85,610
Transmission.....lbs.	100,129	204,231
V-belts.....lbs.	19,903	34,181
Flat belts.....lbs.	18,570	32,842
Other.....lbs.		
Conveyer and levitator.....lbs.	61,446	75,270
Other.....lbs.	2,237	3,183
Hose and tubing.....lbs.	452,639	419,477
Packing.....lbs.	334,294	261,016
Mats, flooring, tiling.....lbs.	314,293	91,891
Thread: bare.....lbs.	1,014	2,122
Textile covered.....lbs.	4,506	14,707
Gutta percha manufactures.....lbs.	575	686
Compounded latex and other rubber for further manufacture.....lbs.	537,153	210,332
Other natural and synthetic rubber manufactures.....		426,125
TOTALS.....		\$9,395,105
GRAND TOTALS, ALL RUBBER EXPORTS.....		\$10,295,934

United States Rubber Statistics—November, 1951

(All Figures in Long Tons, Dry Weight)

	New Supply			Distribution		Month End Stocks
	Production	Imports	Total	Consumption	Exports	
Natural rubber, total.....	0	*33,751	33,751	31,332	67	57,937
Latex, total.....	0	†3,337	3,337	3,705	0	5,752
Rubber and latex, total.....	0	57,108	57,108	35,037	67	63,689
Synthetic rubbers, total.....	‡206,418	714	73,759	65,403	1,162	116,910
GR-S types.....	‡59,516	449	59,988	54,648	98	93,628
Butyl.....	‡26,902	265	7,167	5,704	0	10,629
Neoprene.....	‡55,408	0	5,408	3,984	809	8,669
Nitrile types.....	‡1,196	0	1,196	1,067	255	3,984
Natural rubber and latex, and synthetic rubbers, total.....	73,045	57,822	130,867	100,440	1,229	180,599
Reclaimed rubber, total.....	25,453	60	25,513	24,509	984	44,049
GRAND TOTALS.....	98,498	57,882	156,380	124,949	2,213	224,648

* Includes adjustment of -900 long tons applicable to prior months.

† Includes adjustment of +737 long tons applicable to prior months.

‡ Government plant production.

§ Private plant production.

¶ Includes latices.

SOURCE: Rubber Division, NPA, United States Department of Commerce, Washington, D. C.

Reexports of Foreign Merchandise

UNMANUFACTURED, Lbs.		
Crude rubber.....	162,938	\$120,779
Balata.....	9,088	4,942
GR-S type of synthetic rubber.....	3,310	1,887
TOTALS.....	175,336	\$127,618
MANUFACTURED		
Drug sundries, except water bottles and fountain syringes.....		\$176
Rubber toys and balls.....		1,165
TOTALS.....		\$1,341
GRAND TOTALS, ALL RUBBER REEXPORTS.....		\$128,959

SOURCE: Bureau of Census, United States Department of Commerce, Washington, D. C.

\$117,638
9,249
51,224
40,343
3,603
26,851
25,742
46,625
38,866
56,592

7,348
131,245
119,108
28,243
32,936
8,873
26,423
47,459
4,286
12,607
3,476,069
986,918
77,704
238,897
1,128,522
15,923
3,222
37,318
69,342
287,431
8,153
34,136
46,856
86,471
154,176
26,833
85,610
204,231
34,181
32,842
75,270
3,183
419,477
261,016
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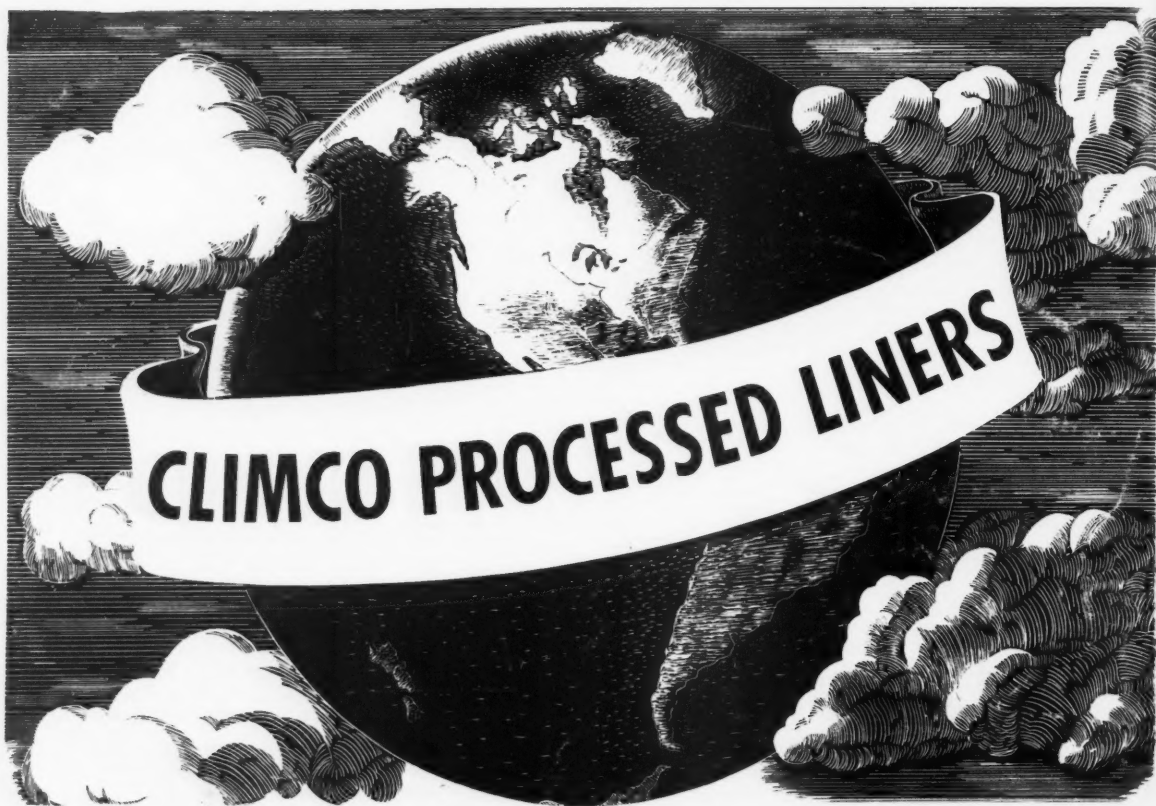
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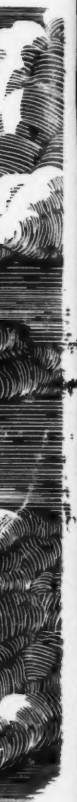
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